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UNITED STATES NAVAL INSTITUTE PROCEEDINGS

Vol. 54 MAY, 1928 No. 303

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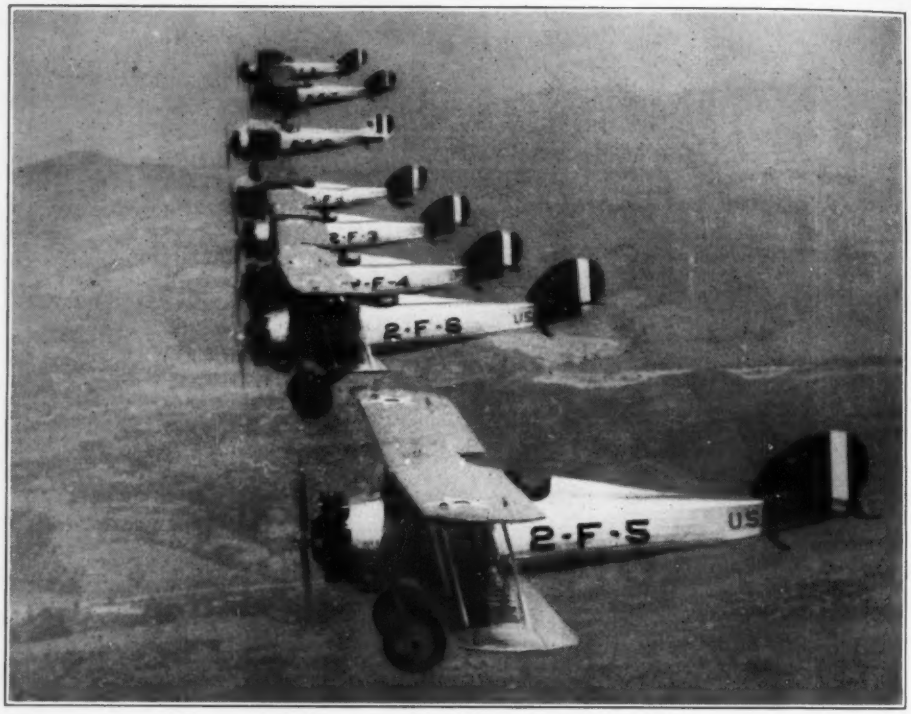

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A PRIZE NOT TO EXCEED FIVE HUNDRED DOLLARS WITH A GOLD MEDAL, and a life membership in the Institute (unless the author is already a life member, in which case he will receive the commuted value thereof), is offered by the Naval Institute for the best essay submitted on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award of the prize to be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay to the Secretary-Treasurer in a sealed envelope marked "Prize Essay Contest." The name of the writer shall not appear on the essay, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary-Treasurer, with the motto on the outside and the writer's name and motto inside. This envelope will not be opened until after the decision of the board. Essays must be received on or before January 1, 1929.

3. In addition to the "Naval Institute Prize," one or more essays may receive "Honorable Mention," if of sufficient merit to justify that award; or, in the event that no essay is adjudged of sufficient merit to receive the "Prize," the best essay submitted may receive "Honorable Mention" in lieu thereof.

4. In case one or more essays receive "Honorable Mention" the writers thereof will each receive a prize, the amount of such awards to be decided by the Board of Control in each case.

5. Announcement of awards will be made as soon as practicable after January 1, 1929.

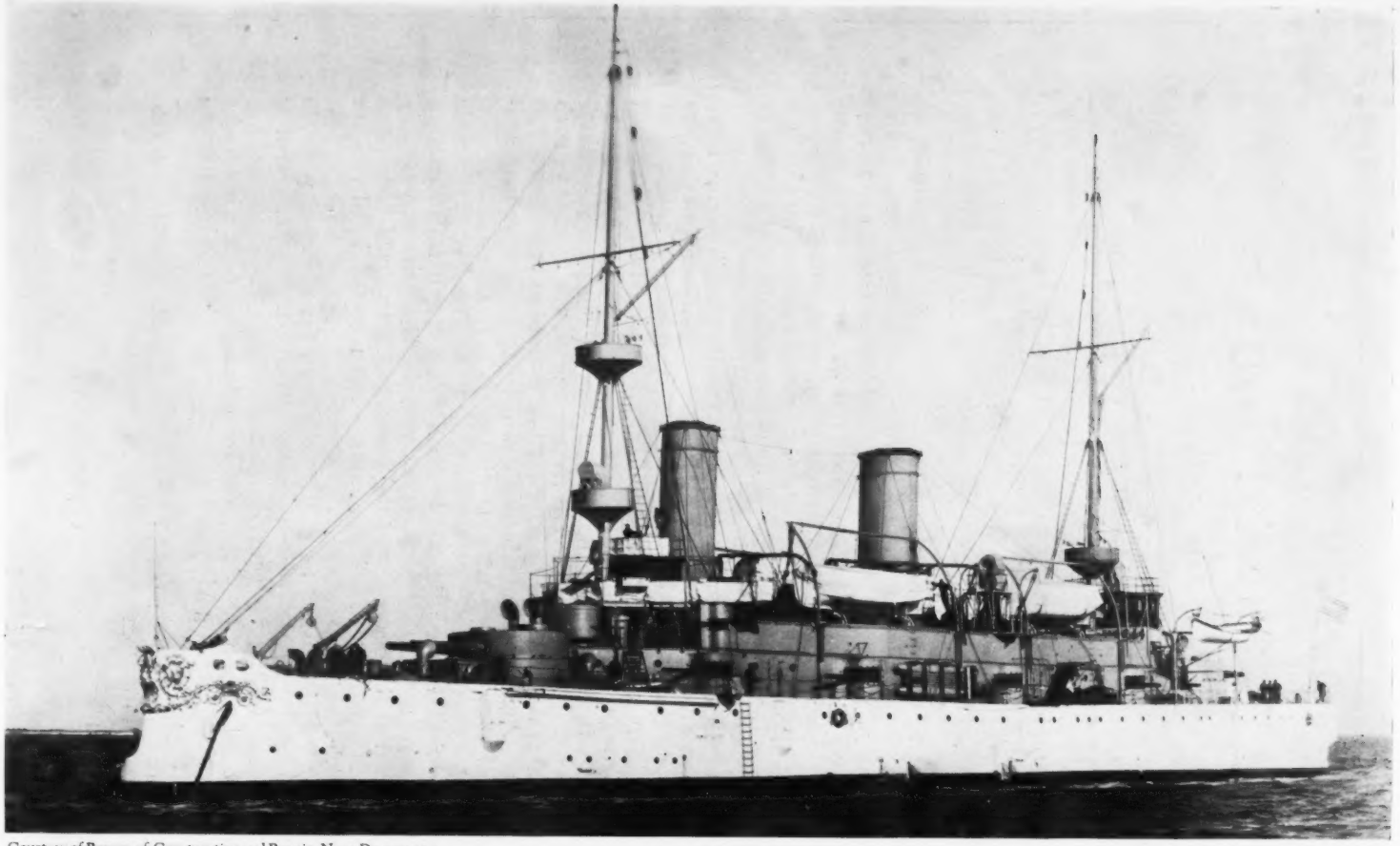
6. Essays awarded the "Naval Institute Prize" or "Honorable Mention" will be published in the NAVAL INSTITUTE PROCEEDINGS as soon as practicable. Essays not awarded a prize may be published at the discretion of the Board of Control, and the writers of such articles shall be compensated at the established rate for articles not submitted in competition.

7. Articles shall be limited to eleven (11) printed pages in the PROCEEDINGS (approximately 8,000 words), but shorter articles will receive equal consideration.

8. In the event of the prize being awarded to the winner of a previous year, a gold clasp suitably engraved will be given in lieu of the medal.

9. All essays must be typewritten, double spaced, and submitted in duplicate.

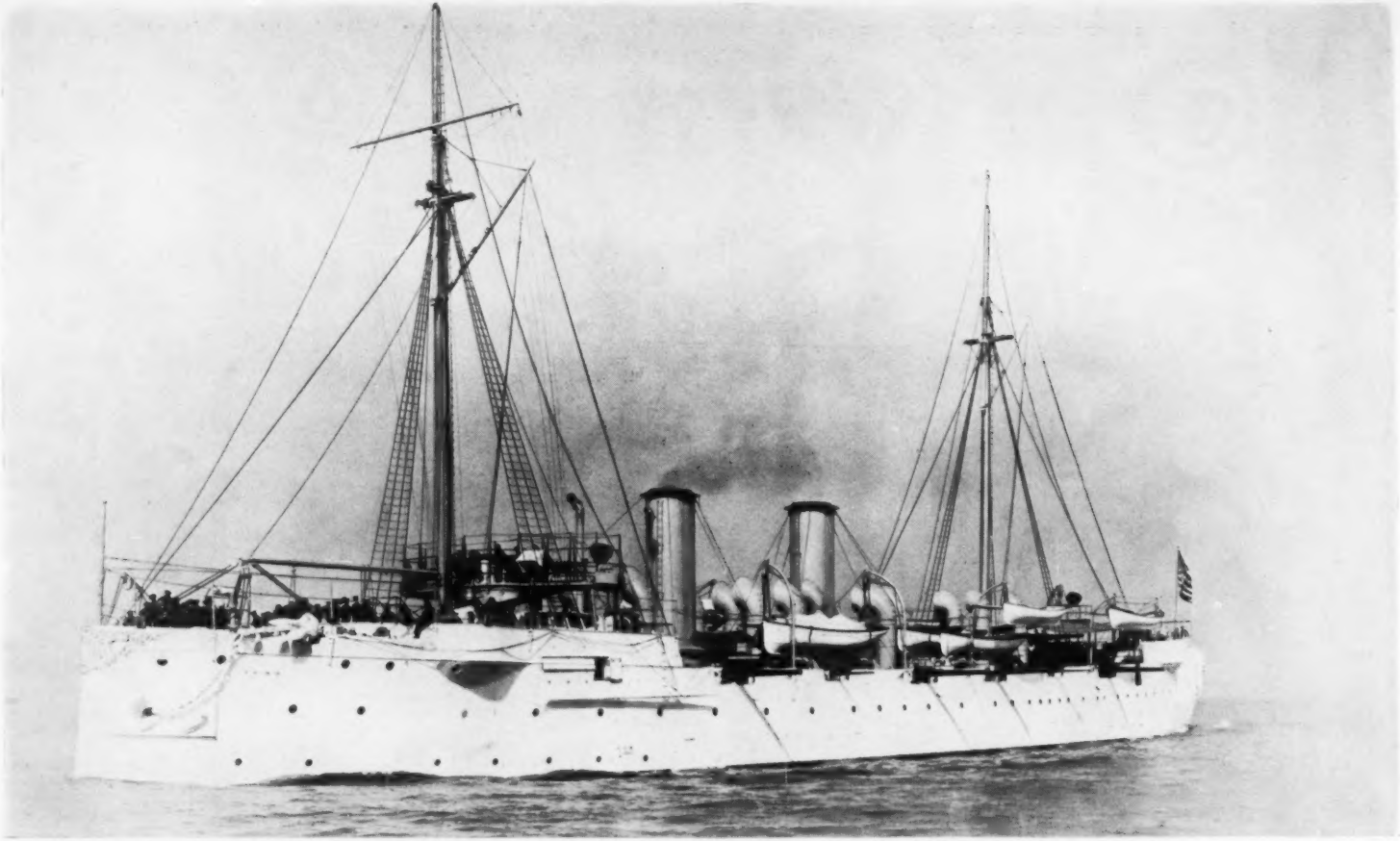
R. C. MACFALL
Captain, U.S.N., Secretary-Treasurer



Courtesy of Bureau of Construction and Repair, Navy Department

U.S.S. *OLYMPIA*
Flagship of Admiral Dewey in the battle of Manila Bay, 1898.

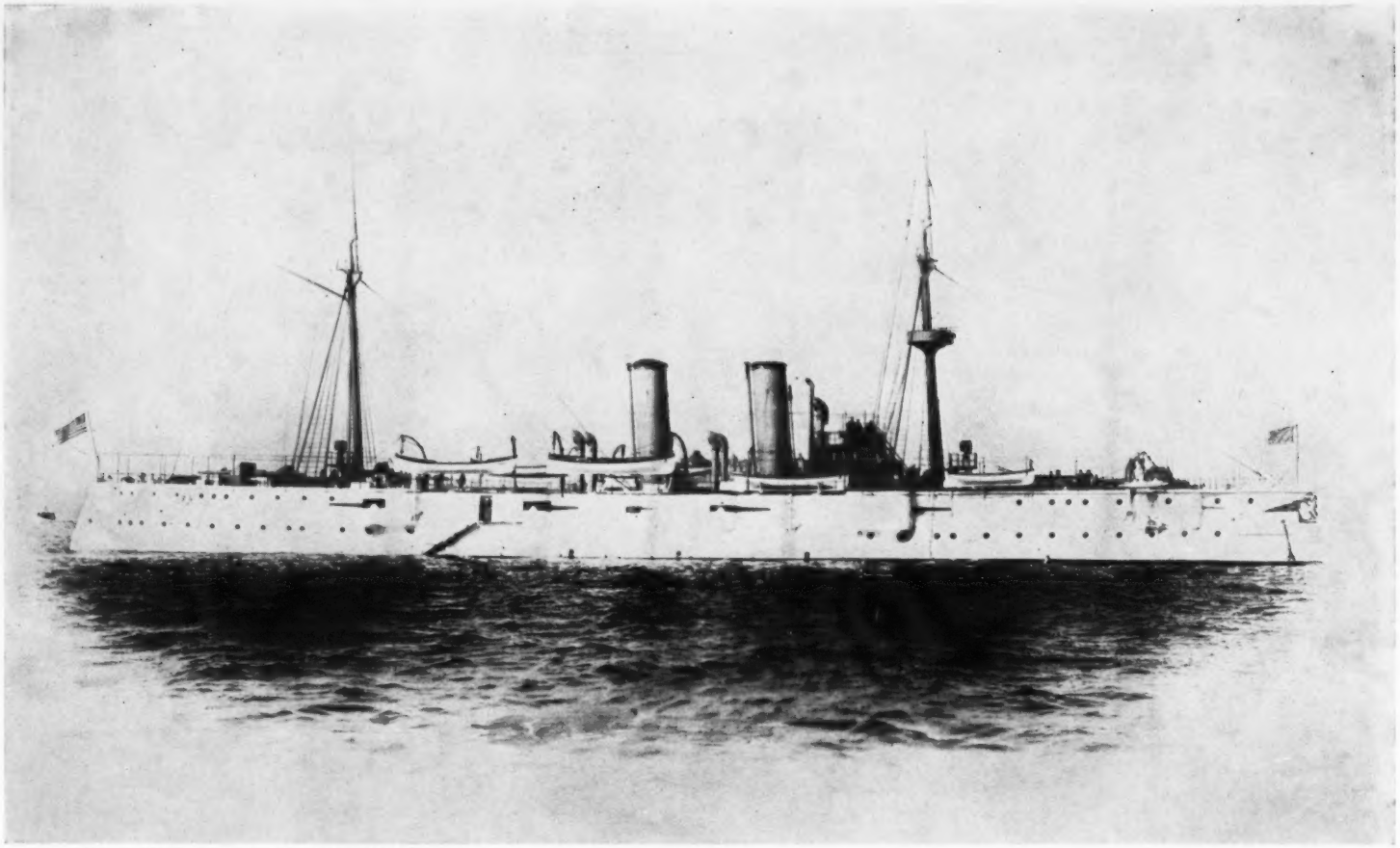
U.S.S. *OLYMPIA*
Flagship of Admiral Dewey in the battle of Manila Bay, 1898.



Courtesy of Bureau of Construction and Repair, Navy Department

U.S.S. *BALTIMORE*

With Admiral Dewey, at Manila Bay, 1898. Protected cruiser. Displacement: 4,412 tons. Speed: 20 knots. Complement 386. Armament: four 8-inch, six 6-inch, four 6-pounder, two 3-pounder, two 1-pounder.



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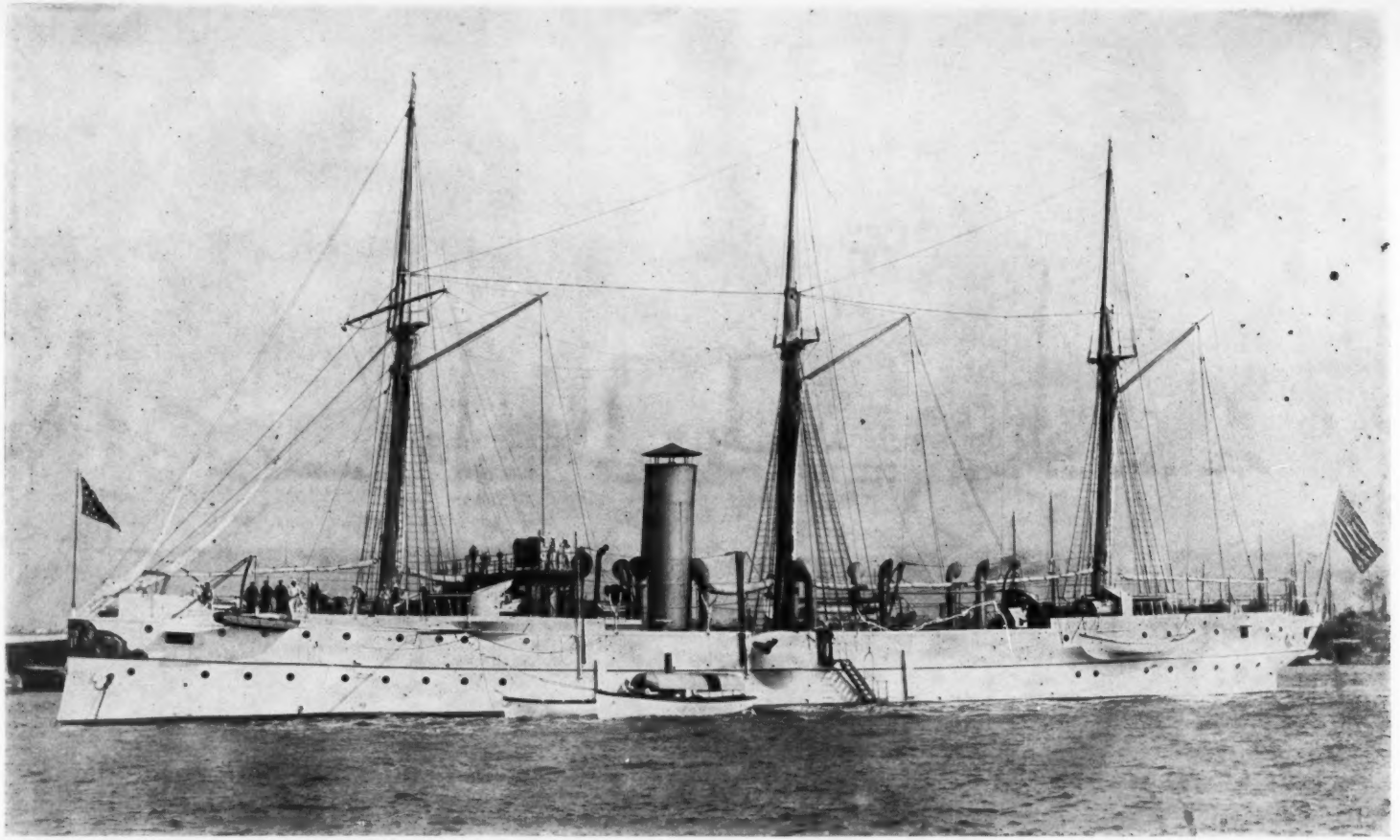
U.S.S. *RALEIGH*

With Admiral Dewey at Manila Bay, 1898. Protected cruiser. Displacement: 3,213 tons. Speed: 19 knots. Complement: 320. Armament: one 6-inch, two 5-inch, eight 6-pounder, four 1-pounder.

With Admiral Dewey at Manila Bay, 1898. Protected cruiser. Displacement: 3,213 tons. Speed: 19 knots. Complement: 328. Armament: one 6-inch, two 3-inch, eight 6-pounder, four 1-pounder.



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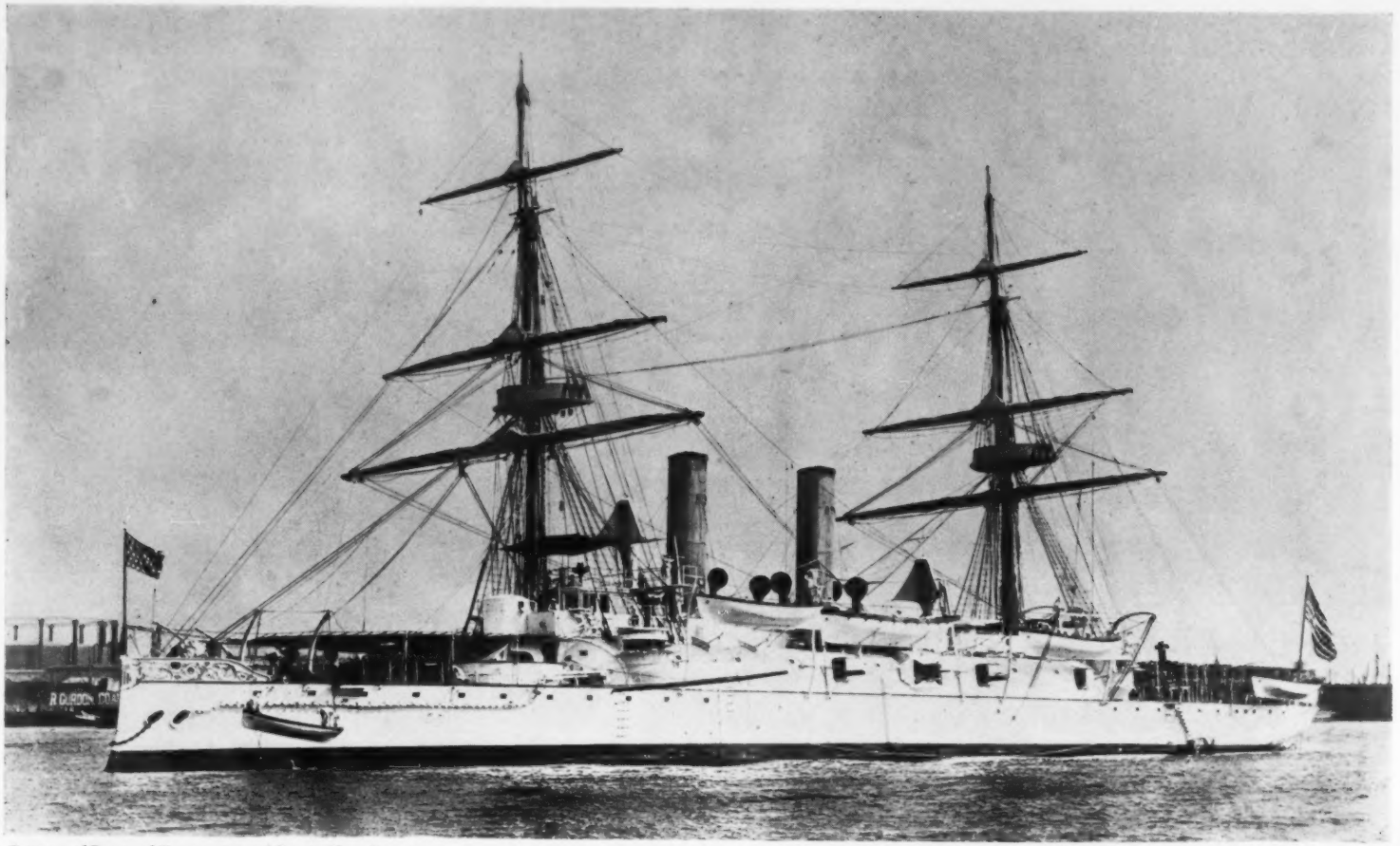
U.S.S. *CONCORD*

With Admiral Dewey at Manila Bay, 1898. Gunboat. Displacement: 1,710 tons. Speed: 16.8 knots. Complement: 194. Armament: six 6-inch, two 6-pounder, two 3-pounder.



Courtesy of Bureau of Construction and Repair, Navy Department

U.S.S. *BOSTON*

With Admiral Dewey at Manila Bay, 1898. Protected cruiser. Displacement: 3,000 tons. Speed: 15.6 knots. Complement: 278. Armament: two 8-inch, six 6-inch, two 6-pounder, two 3-pounder, two 1-pounder.

U.S.S. *McCULLOCH*

With Admiral Dewey at Manila Bay, 1898. Revenue cutter. Displacement: 1,300 tons. Speed: 15 knots. Complement: 120. Armament: four 6-pounder. Transferred to the Asiatic Squadron in April, 1898, while making voyage from Atlantic to Pacific Coast of the United States via Asia.

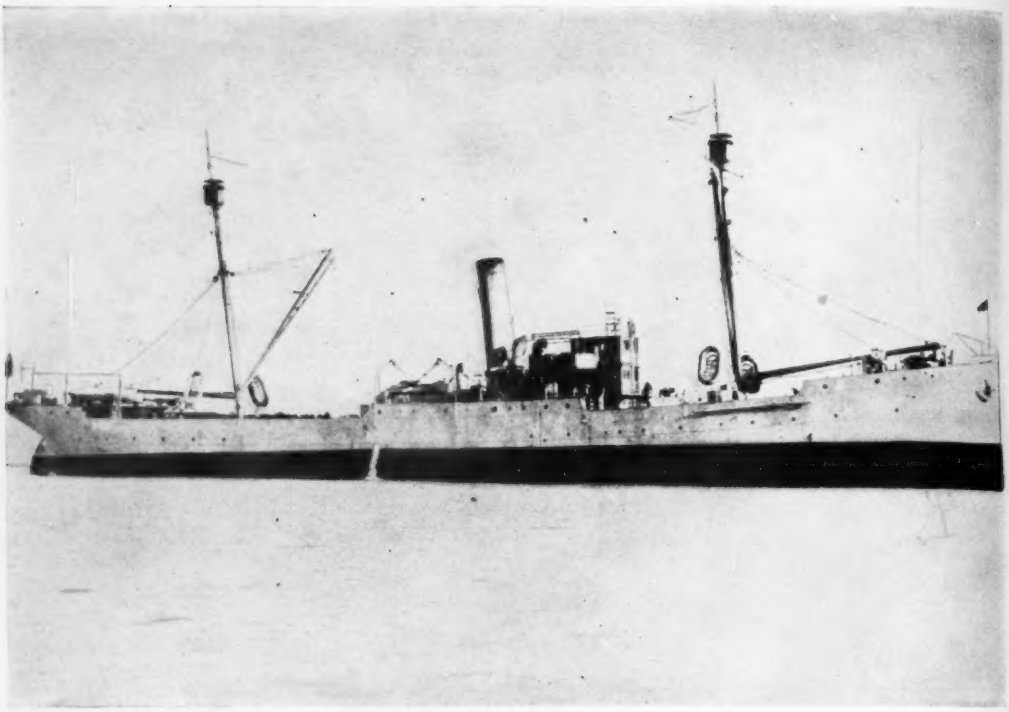
U.S.S. *BOSTON*

With Admiral Dewey at Manila Bay, 1898. Protected cruiser. Displacement: 3,000 tons. Speed: 15.6 knots. Complement: 278. Armament: two 8-inch, six 6-inch, two 6-pounder, two 3-pounder, two 1-pounder.

Courtesy of Bureau of Construction and Repair, Navy Department

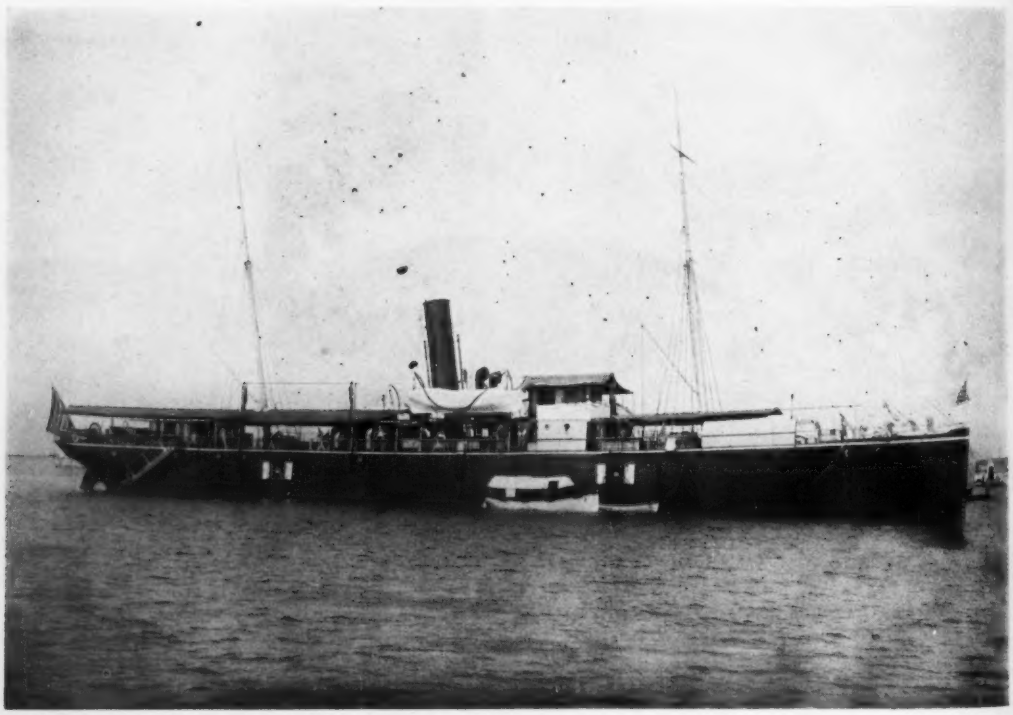
U.S.S. *PETREL*

With Admiral Dewey at Manila Bay, 1898. Gunboat. Displacement: 892 tons. Speed: 11.8 knots. Complement: 122. Armament: four 6-inch, two 3-pounder, two 1-pounder.



U.S.S. *NANSHAN*

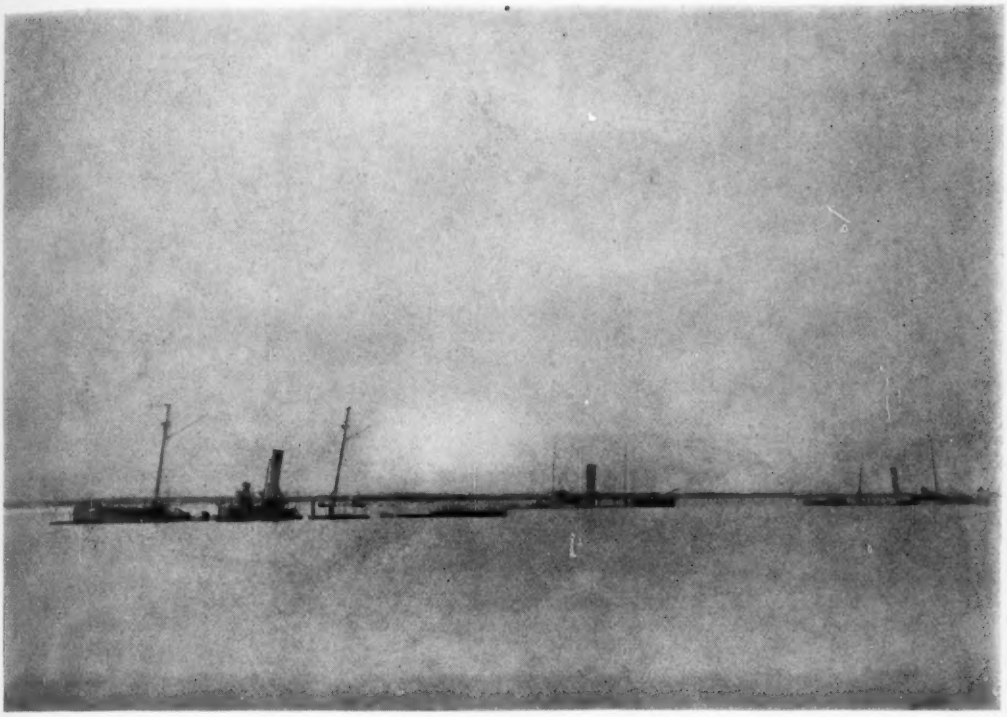
With Admiral Dewey at Manila Bay, 1898. Collier: Displacement: 4,000 tons. Speed: 11 knots. Complement: 125. Armament: two 3-pounder. Purchased at Hong Kong, April, 1898.



Courtesy of Bureau of Construction and Repair, Navy Department

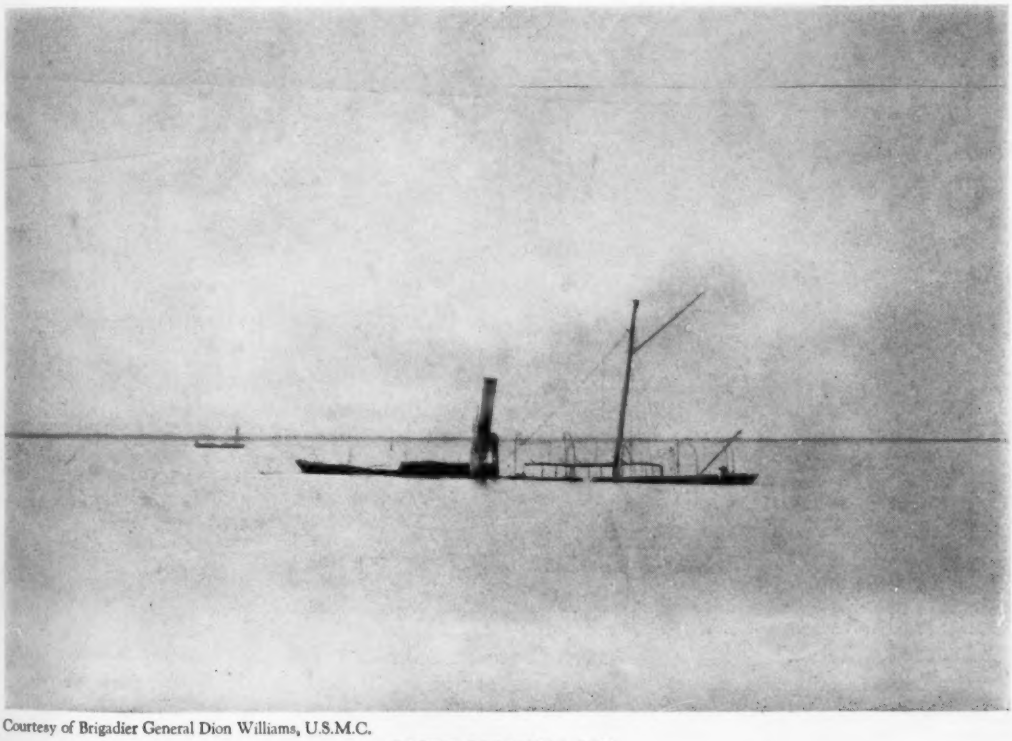
U.S.S. *ZAFIRO*

With Admiral Dewey at Manila Bay, 1898. Supply ship. Displacement: 2,000 tons. Speed: 12 knots. Complement: 60. Armament: two 3-pounder. Purchased at Hong Kong, April, 1898.



BATTLE OF MANILA BAY

Wreck of the Spanish ships *Don Juan de Austria*, *Isla de Luzon* and *Isla de Cuba* in Bacoor Bay. Photographed shortly after the battle.



Courtesy of Brigadier General Dion Williams, U.S.M.C.

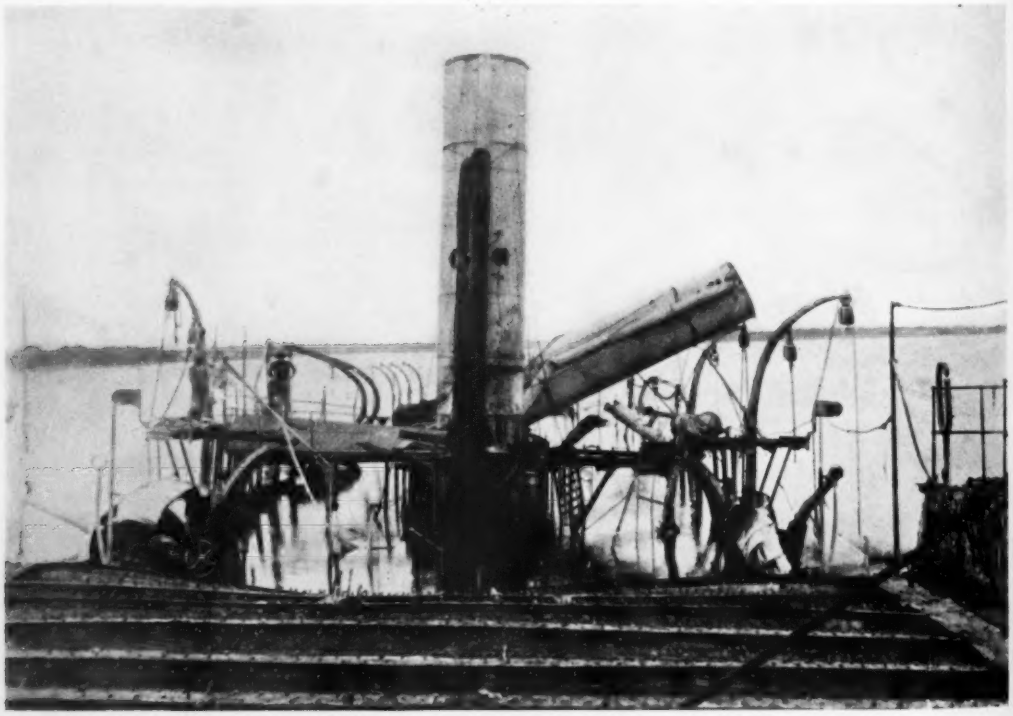
BATTLE OF MANILA BAY

Wreck of the Spanish gunboat *Marques del Duero*. Photographed shortly after the battle.

BATTLE OF MANILA BAY

Spanish ship *Castilla* sunk during the battle.

Spanish ship *Don Juan de Austria* sunk during the battle.



Courtesy of Brigadier General Dion Williams, U.S.M.C.

BATTLE OF MANILA BAY

Wreck of the Spanish flagship *Reina Christina*, sunk in the battle. Photographed shortly after the battle.

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UNIV. OF MICH.

The Age of Sail

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UNITED STATES
NAVAL INSTITUTE
PROCEEDINGS

Vol. No. 54, No. 5 MAY, 1928 *Whole No. 303*

The Battle *of* Manila Bay

By FIRST LIEUTENANT DION WILLIAMS, *U. S. Marine Corps*

(Written in 1898.)

ON SUNDAY, April 24, when the war between the United States and Spain broke out, the United States Asiatic Squadron under command of Commodore George Dewey, lay at Hong Kong ready in every respect for sea.

This squadron consisted of the first class protected cruiser *Olympia,* of 5,870 tons displacement, flagship; the second class protected cruisers *Baltimore,* 4,500 tons; *Raleigh,* 3,200 tons; and *Boston,* 3,000 tons; the gunboats *Concord,* 1,700 tons; and *Petrel,* 890 tons; the revenue cutter *Hugh McCulloch,* 1,300 tons; and the transports *Nanshan,* 4,000 tons; and *Zafiro,* 2,000 tons.

The *Baltimore* had arrived from Honolulu on April 22 with a supply of ammunition for the other ships of the fleet and was docked and cleaned, and filled up with coal and stores with the greatest despatch; the *McCulloch,* while on a voyage from New York to San Francisco by way of China, had been turned over to the Navy Department by the Treasury Department when war became imminent; the *Nanshan* and *Zafiro* had been purchased from their English owners just prior to the war, their original English crews gladly remaining with them.

On the twenty-fourth the English governor of Hong Kong, in the interests of neutrality, requested our fleet to leave Hong Kong, as a state of war existed and we were avowedly fitting out for a hostile expedition against Manila. Our fleet accordingly moved thirty miles eastward to Mirs Bay in Chinese waters, from which communication was kept up by means of tugs with Hong Kong.

On the afternoon of the twenty-fifth Commodore Dewey received a cablegram from the Navy Department announcing that a state of war existed, and ordering him to proceed to the Philippine Islands and capture or destroy the Spanish fleet there.

According to the best information at that time the Spanish fleet in the Philippines consisted of the protected cruiser *Reina Christina,* 3,600 tons; the composite cruiser *Castilla,* 3,260 tons; and the gunboats *Velasco,* 1,150 tons; *Don Juan de Austria,* 1,159 tons; *Don Antonio de Ulloa,* 1,160 tons; the sister ships *Isla de Cuba* and *Isla de Luzon,* 1,045 tons; *Elcano,* 560 tons; *General Lezo,* 520 tons; *Marques del Duero,* 500 tons; the sister ships *Villalobos* and *Quiros,* 324 tons; and twenty small river gunboats ranging from 50 to 200 tons, under command of Admiral Patricio Montojo y Pasaron.

In addition it was reported that the channels leading into Manila Bay, the Boca Chica and the Boca Grande, were mined, and that batteries were mounted on Corregidor Island in the midchannel, and on the mainland north and south of the entrance.

All arrangements having been completed, at 2:00 P.M. on the twenty-seventh, the squadron weighed anchor and proceeded

under easy steam, at nine knots speed toward Manila, 600 miles away.

Before leaving Hong Kong the ships had been painted a dull slate color from water line to main truck and the yards had all been unshipped except light signal yards. During the twenty-eighth and twenty-ninth the ships were cleared for action. Awning stanchions and all deck hamper not necessary in battle were unshipped and sent below, and, following the lesson of the Yalu, all woodwork not absolutely necessary was thrown overboard. Gratings, skylights, tables, mess-benches, and in some of the ships, the wooden bulkheads in the officers' quarters were unshipped and thrown over the side.

Drills were carried on night and day, and the engines and guns put in the best possible working trim.

Arriving off the coast of the Island of Luzon, eighty miles north of Manila, at daylight on the thirtieth, two of the ships of the squadron were sent ahead as scouts to reconnoiter the bays and inlets, but they found them deserted.

At sundown the commanding officers of all the ships of the squadron were ordered aboard the flagship and informed by the commodore that the fleet would enter Manila Bay by night with every light screened, and run the batteries there, taking the southern and larger channel, the Boca Grande.

At 7:30 P.M. the crews were called to quarters, the guns loaded, and with every man at his station, the squadron, steaming in column at 400 yards distance between vessels, at six knots speed, entered the Boca Grande in the following order: *Olympia, Baltimore, Raleigh, Petrel, Concord, Boston, McCulloch, Zafiro,* and *Nanshan.*

The moon was in the first quarter and the sky partially cloudy, while a low haze hung near the land, and it seemed certain to everyone on board that the lookouts at the forts and shore batteries would soon discover our ships.

Yet looking down the line from the leading vessels the following ships showed, even at that close distance, only in dim outline, and clearly proved the value of the so-called invisible war color.

At 11:30 a red rocket shot up from the crest of Corregidor Island, and the anxious watchers on the ships knew that we were discovered by the enemy, and everyone waited in silence for the first gun from the shore batteries, or the dull boom that would announce the explosion of a dreaded mine.

The long dark line of ships moved steadily on, but not until 12:15 A.M. did the first gun on shore speak, followed at long intervals by several more, the shells from all of which whistled harmlessly over us.

At 2:10 A.M., having successfully passed the entrance, the flagship stood for the center of the bay and signaled speed four knots, aiming to arrive off Manila at daylight. The fighting force followed in column, the reserve squadron, composed of the *McCulloch, Nanshan,* and *Zafiro* forming a second column on the port beam.

The gun crews sat down near their guns, but few slept, every man from the commodore to the Chinese steerage boys anxiously awaiting for the bugle call that would send them to battle quarters for the longed-for fight with the Spanish fleet. The only doubts were that the Spaniards might have given us the slip and scattered among the thousand islands of the Philippines, in which case it might have taken months to hunt them down.

At daybreak the city of Manila was visible about five miles off the starboard beam, and a few merchant sailing ships were anchored close in shore. The crews were called to battle quarters and silently fell in at their stations, and turning to starboard the squadron steamed along in front of Manila.

At 4:40 A.M. the Spanish fleet of ten vessels could be made out in an indented line between Sangley Point and the shore at Las Pinas. At 4:55 A.M. the shore batteries at Manila fired on us, but the shots fell far short and only the *Raleigh* and *Concord* replied.

The reserve squadron hauled off to the northward and lay to, awaiting the result of the battle.

At 5:05 the flagship signaled "Prepare for general action," and the Stars and Stripes broke out from every masthead as the squadron of six ships stood straight for the Spanish fleet, keeping perfect distance at 400 yards between ships.

At 5:15 the enemy bore on the starboard bow distant about 6,000 yards, when the Spanish fleet opened fire supported by the shore batteries on Sangley Point, but their shots at first fell short by a thousand yards. At 5:30 our squadrons opened fire with the

starboard batteries and then turning to starboard, steamed slowly along in front of the enemy on a general westerly course, firing with the port batteries. The action then became general.

Our gunners soon got the range and fired with the coolness and deliberation of target practice, many of the shots striking home. The Spaniards' gunnery was poor, their shots falling short or passing over us with that sharp "whirr" which once heard is never forgotten. From my station on the high forecastle of the *Baltimore*, the second ship in our column, I had a clear view of the battle, and by the aid of field glasses could see many of our shots strike the Spanish cruisers.

The Spanish ships maneuvered but little, the *Castilla, Velasco,* and *Ulloa* remaining at anchor throughout the engagement while the rest of the fleet moved in and out behind Cavite Point.

At 5:45 the flagship signaled "Close up, speed six knots," and after passing them on the first run, our column turned to starboard and steamed back to the eastward, firing with the starboard batteries.

During this run past the enemy's position his fire increased and his shots fell closer; one 4.7-inch armor piercing shell striking the *Baltimore* just abaft the after 6-inch gun, passing through the side and ripping up the spar deck for several feet. Deflecting slightly upward and passing through the after engine room hatch, it struck and disabled the port after 6-inch gun, denting one of the recoil cylinders, cutting a deep furrow on the inner side of the 2-inch gun shield and coming to rest on the deck without exploding.

Beneath where this shell struck the deck, the seven-inch steel deck beam was bent down three inches and nearly broken, and in its flight the shell struck a box of three pounder Hotchkiss ammunition, one of the cartridges of which exploded. The splinters wounded two officers and six men, and had the shell exploded many would have been killed.

Ensign Irwin, who commanded the gun division where this shell struck, was wounded by a flying splinter of steel and thrown to the deck. As he regained his feet the executive officer, noticing the extra noise and confusion and thinking some accident had occurred at the after 6-inch gun, sang out, "My God, what are you trying to do, Irwin?"

Saluting with his wounded right arm the ensign replied "Nothing, sir, that was just a Spanish shell that came aboard," and turning to his gun rearranged the crew on account of the six wounded men and continued the fire against the enemy.

The injured gun on the opposite side was fired once as that side came into action on the next round, but owing to the dented recoil cylinder it would not return to battery, and had to be abandoned for the rest of the action. After the battle the gunner's gang worked all night on the disabled gun and before the next morning had repaired it temporarily so that it could be fired with comparative safety.

A six-pounder Nordenfeldt shell passed through the *Baltimore's* side about fifty feet from the bow and exploded in the berth deck without doing any damage.

One small projectile struck the forward turret of the *Olympia* but exploded without doing any damage; another shell passed over the forward bridge of the flagship where the commodore had taken his station, and cut one of the shrouds.

Turning to starboard the column again steamed to the westward, firing with the port batteries at 4,000 yards. At 6:18 the flagship signaled "Don't turn so quick," and at 6:50 smoke could be seen pouring out of the after hatches of the Spanish flagship *Reina Christina* while her fire visibly slackened. She had been struck by many of our shells, her steering gear was carried away, and she was afire in several places.

The *Castilla* was also on fire and the loss of life had been great on both of these ships, as our fire had been mostly concentrated on them on account of their large size.

During this run a six-pounder shell penetrated the *Baltimore* at the water line amidships exploding in a coal bunker, while another passed through the cowl head of the forward ventilator, and still another penetrated the side amidships and, striking a pipe on the berth deck, exploded without doing any damage to the crew.

At the end of the run to the westward the column turned to starboard and made its last run to the eastward, firing with the starboard battery. The small Spanish ships had sought cover behind Cavite Point, but the *Reina Christina, Castilla,* and *Don Juan de Austria* remained off the point and

kept up a fire against us, while the *Don Antonio de Ulloa* fired from behind the low sand spit of Sangley Point.

Near the end of this run some of the small Spanish craft sought shelter behind the walls of Cavite, and an enthusiastic signal boy, probably without authority, signaled by a wig-wag flag from the after bridge of the *Olympia*, "Half whipped."

Turning to starboard the column steamed for the third and last time to the westward, firing steadily with the port batteries. At 7:00 A.M. the flagship signaled "Close up," as the column had straggled out a little, each ship being too intent on its own work.

At 7:35, as the enemy's fire had almost ceased, our ammunition was rapidly disappearing, and our crews had been at their quarters for twelve hours, the commodore signaled to the fleet, "Withdraw from action," and the squadron steamed out of range of the Spanish shore batteries and lay to, while the captains of all the ships hurried aboard the flagship in obedience to orders by signal and reported to the commodore.

One after another they reported the results of the action, their injuries, and the condition of their ammunition magazines. The commodore probably felt more anxiety on this subject of ammunition than on any other, for we were 7,000 miles from our nearest base of ammunition supply, while the total supply carried by a modern cruiser may be fired away in a few hours, and we might have other battles yet to fight before a fresh supply could reach us.

Having received satisfactory replies from all his captains on this vital point, nothing stood in the way of finishing the now crushed and demoralized enemy but breakfast, which was taken *al fresco* by the tired and hungry but happy and jubilant officers and men as they watched the smoke break into flames on the doomed *Castilla* and *Reina Christina*.

The damage to our fleet had been very slight. Besides the hits already noted, the *Boston* was struck four times, one shot passing through the steel foremast a few feet above the line of the bridge where Captain Wildes and his aides were standing; another penetrating the side abreast the wardroom, exploding and setting fire to the inflammable woodwork there, which was soon extinguished; the third striking the superstructure deck and exploding in the hammock nettings; while the fourth struck the side amidships abreast the berth deck. Two of the crew were slightly wounded by splinters. The *Baltimore* was the only other ship which had any wounded, two officers and six enlisted men, all wounded by splinters and all of whom have recovered without any serious consequences.

On the *Baltimore* one sailor with one of the small bones of his leg broken insisted on going back to his gun, after the doctor had dressed his leg, and finishing out the rest of the fight.

The loss on the Spanish side had been great, however, and their flagship, the *Reina Christina*, the *Castilla*, and one of the gunboats could be seen burning. At 9:00 A.M. a heavy explosion occurred on the *Castilla*, probably a magazine, followed by smaller explosions as the fire reached the charges for the guns on deck; and shortly after this she sank in shoal water still burning fiercely.

At 10:45 A.M. our squadron got underway to go in and finish the work. A steamer was sighted standing up the bay from the Boca Chica and the *Baltimore* was sent to intercept her, but she proved to be the English mail steamer *Esmeralda*, and the flagship signaled "Engage shore batteries *Baltimore* leading." The *Baltimore* then turned and stood in toward Cavite.

The batteries on Sangley Point and the *Don Antonio de Ulloa* behind the point opened fire, but the *Baltimore* answered with a perfect hail of shell at about 2,500 yards range, the rapidity of fire greatly exceeding that of the first engagement, and the batteries were silenced in thirty minutes, while the crew of the *Ulloa* deserted her, leaving the colors still flying, and she soon sank with only her forward upper works above the water.

Her flag was afterwards found nailed to its staff and was secured by a boat's crew from the *Petrel*.

The rest of the squadron came up in twenty minutes and after firing a few shots into Cavite arsenal, the five Spanish flags which were flying there were hauled down and the white flag was run up. The gunboat *Petrel* was ordered to go into Bacoor Bay back of Cavite Point and destroy the Spanish shipping there, and at 12:50 P.M. she signaled from inside the point, "A general surrender."

The Spanish had scuttled their ships and

deserted them, and sinking in shoal water only their upper works remained above the water line.

Under orders from the commodore, the *Petrel's* crew set fire to the Spanish ships and most of the woodwork above the water burned, while the *General Lezo* was ruined by an explosion of a magazine.

The Spanish mail steamer *Isla de Mindanao,* which had arrived ten days earlier from Spain with large stores of ammunition, had been run aground by her crew between Las Pinas and Bacoor, and the *Concord* was sent to examine her. She fired upon the *Concord* and was fired on in return by the *Concord* and *Olympia.* These shots set her on fire and, her crew deserting her, she burned during the day and night.

The armed transport *Manila* of 2,000 tons displacement was captured inside of Cavite Point, and officers and a crew from our fleet were put aboard of her. Though very dirty she was otherwise in excellent condition and with additional guns captured from the enemy mounted aboard, makes a valuable addition to our fleet. The small steamer *Mindanao,* which was undergoing repairs at the yard, was also captured in the bay. She is uninjured though some of her machinery is in the shops of the navy yard.

In the engagement the Spanish lost all the ships of their fleet, including the flagship *Reina Christina;* the cruisers *Castilla, Don Antonio de Ulloa, Don Juan de Austria, Velasco, Isla de Cuba,* and *Isla de Luzon,* the gunboats *General Lezo,* and *Marques del Duero,* and the armed Hydrographic Commission steamer *Argos* of 500 tons.

Of these the *Reina Christina,* the *Castilla,* and the *Don Antonio de Ulloa* are lying outside of the Bay of Bacoor, where they were sunk by our terrific fire. The remaining seven are sunk inside of Cavite Point with their upper works partially above water. The *Reina Christina* and *Castilla* are complete wrecks, and while they burned during the afternoon and night after the fight, frequent explosions occurred aboard them. The *Castilla's* sides being of wood, she burned to the water's edge.

A few feet of the sides of the *Reina Christina* show above the water, surmounted by a mass of twisted and blackened iron, deck beams, upper works, and davits, but even after all the woodwork has been burned the results of our fire can be seen in many places. The *Ulloa* sank with only her forward upper works out of the water, but in these parts of her forty hits have been counted.

All of the seven ships inside had been scuttled and deserted by their crews, and show evidences of our gunnery. The *Don Juan de Austria* showed fourteen hits in the part above the water; one of these had completely disabled her steering gear and must have rendered her unmanageable, as she had only a single screw. The *Isla de Cuba* and the *Isla de Luzon* are apparently but little injured and are to be raised, repaired, and put into the service of the United States.

A large number of small tugs and launches were captured and are being used as tenders by the ships of our fleet. Many of the guns on the Spanish ships are practically uninjured and some of them have been remounted on our ships and tenders, while the others will be sent to the United States.

As several white flags were flying in Manila on the afternoon of the first, the United States Consul to Manila, O. F. Williams, who had been with our squadron since April 27, opened communication with the Spanish governor general at Manila.

Under directions from the commodore the consul demanded the surrender of the Spanish ships in the Pasig River and the promise from the governor general that the batteries at Manila would not fire upon our squadron, and threatened that in case of any hostile move on the part of the Spanish, our squadron would destroy the city. The governor general declined to say whether there were any other gunboats near Manila, but promised not to fire on us as long as we refrained from attacking Manila.

On the night of the first the squadron anchored off Manila and Cavite, keeping an especially bright lookout for torpedo attacks. About 11:30 P.M. the commander at Cavite asked for terms, and on the second that place with the navy yard, arsenal, and forts situated there, were abandoned by their defenders. These forces, comprising in all about 2,500 officers and men, moved out toward Manila with their arms and what stores they could carry.

On the morning of the third a marine guard from the *Baltimore* landed, established sentry posts around the navy yard, and hoisted the Stars and Stripes, the first

to be raised over captured territory in the Philippines.

The store houses, work shops, offices, and dwellings were commodious and well fitted. Large stores of material for the construction and repair of ships, engines, and guns were found, while the magazines held immense supplies of shell and powder for the guns of the fleet. In one building six Schwartzkopf-Whitehead torpedoes were found, and everywhere were to be seen evidences of the hasty preparations which must have followed the declaration of war.

The grounds are well laid out and the shady roadways are bordered with little plazas with fountains and shrubbery. Sweet smelling tropical flowers bloom amid the horrors of war and spread their perfume in the air, where it mingled with the sickening stench of the Spanish dead, whose comrades had left them unburied.

On the second of May the *Raleigh* and the *Baltimore* steamed down to the entrance of the bay and, entering the Boca Chica, demanded the surrender of the batteries there. The Spanish governor resident at Corregidor came on board and signed articles of capitulation, and the guns, fifteen in all, were afterward destroyed or disabled.

The Spanish officers said that many contact mines had been placed in the channel, and expressed great surprise that our ships had not been blown up, but we found none of them after steaming all over the channel.

With the exception of a few of the officers of high rank, none of the men who manned our squadron had ever been in action, and yet they stood to their guns during the action with all the coolness and courage of veterans, and the firing was done with the accuracy and precision of a target practice drill. All the guns worked without a hitch and the firing was rapid while passing the enemy's position.

When in turning at the end of the runs the ships of the American squadron passed each other close aboard, the crews of the passing ships cheered with that ringing cheer which marks the Anglo-Saxon spirit, and presented a series of stirring incidents amid the roar of the battle.

The Spaniards also fought their guns with great courage and determination, although their gunnery was especially poor.

According to the report of the Spanish Admiral Montojo, he fought his ships until the *Castilla* was destroyed, the *Reina Christina* unmanageable and afire in many places and the *Don Juan de Austria* and one gunboat disabled, and then at 7:30 A.M., seeeing that further resistance would simply mean the sacrifice of his brave men, he transferred his flag to the *Isla de Cuba* and ordered the remaining ships to seek cover behind Cavite Point in Bacoor River.

On April 25 with the *Reina Christina*, the *Don Juan de Austria, Isla de Cuba, Isla de Luzon, Castilla, Marques del Duero*, and transport *Manila*, Montojo had gone to Subig Bay intending to fight our squadron there, aided by the shore batteries which he supposed had been erected.

Finding that the batteries had not been erected, and learning from the Spanish consul at Hong Kong that the American squadron had sailed for Subig and Manila to fight the Spanish fleet, a council of war was held and it was decided to return to Manila Bay and await the attack in the shoal water off Sangley Point and Cavite, where the *Castilla* and *Ulloa* could fight at their moorings while the shore batteries could give additional support. Both the *Castilla* and *Ulloa*, on account of disabled machinery, were incapable of motion by their own power and were thus no more than floating batteries.

The naval experts of our squadron generally agree that considering all the difficulties with which Admiral Montojo had to contend, the disposition he made of his ships was the best to be expected. However, several of his smaller vessels were fitted with torpedo outfits and had these ships courageously steamed out to meet us within torpedo range they might have sunk one or more of our ships, although at the almost certain risk of the loss of their ships with all on board.

Our arrival at Subig at 3:00 P.M. on the thirtieth was telegraphed to Montojo at Manila and from then until our arrival off Cavite he was kept informed of our movements, and had his squadron as well prepared to meet us as lay in his power, so the many stories of a surprise are groundless.

But by most of the precedents of naval warfare, the Spanish admiral was justified in thinking, as he did, that we would first send out scouts to reconnoiter his position, so the boldness and decision with which Admiral Dewey took the entire American

squadron in to the attack regardless of torpedoes and shore batteries must have been a surprise to the ever-cautious Spaniard.

Yet the Spanish fleet was ready for the battle and opened the fire upon us at long range some minutes before we saw fit to reply. What they expected to do will probably ever remain a mystery as Admiral Montojo says he knew they were certain to be defeated before the fight began, while many of his officers have said since the battle that they relied upon the support of the shore batteries to make up for our superior sea force and thought that the chances were equal for their ultimate victory.

The Spanish lost, according to their own account, 320 killed and nearly 300 wounded. Of these the *Reina Christina* lost 150 killed, including the captain, captain's clerk, chief engineer, surgeon, and boatswain, and ninety wounded, including the executive officer.

The *Castilla* lost 110 killed, including the second engineer, and 160 wounded, including the captain and one lieutenant.

The *Don Antonio* lost sixteen killed and fifteen wounded, including the captain, paymaster, and surgeon.

The *Don Juan de Austria* lost fifteen killed, including one lieutenant, and thirty-five wounded, including the chief engineer and one lieutenant.

At one of the batteries on Sangley Point, composed of two Hontorio 6.2-inch rifles, six men were killed and four wounded.

The remaining killed and wounded were from the other ships and from the shore batteries and barracks. It is quite probable that many of the wounded went down with the sinking ships or were burned to death in the fierce fires, as most of the wounded were left on the *Castilla* and *Reina Christina* when those ships were hastily abandoned by their crews.

Many of the wounded were removed to the hospitals in the arsenal and the town of Cavite. Surgeons from our ships who visited these hospitals after the battle say that, although the Spanish surgeons had large stores of the very best material for dressing wounds, their surgery was very bad. In many cases of cut arteries, instead of tying them, they had used perchloride of iron and the dressings were also very poor. This could be accounted for in part by the great confusion incident to the crushing defeat and the large number of the wounded. After the evacuation of Cavite by the enemy, many of the wounded were taken to Manila on board one of our tenders under a flag of truce.

When our force landed on the third the naval hospital at the Cavite arsenal presented a scene of the greatest confusion. The cots from which the wounded had been removed were covered with blood-soaked bandages, and surgical instruments and medicines were scattered about. Under the portico in the rear of the building eight of the Spanish dead had been laid out in a row. Some of these bodies were dressed in underclothing such as officers would wear; all were frightfully mangled, and decomposition had set in so that the stench was pronounced. They were buried in an unmarked grave by men from our ships.

It seems a remarkable fact that, although the Spanish had twenty-four hours between the battle and the evacuation, they had not buried their dead but left them on the ships and in the hospitals. The bodies on the sunken vessels were devoured by the sharks that infest these waters and the ones on shore were buried by us.

The accompanying tables show the principal data of the Spanish ships engaged, but though there is an apparent inferiority of their force as compared with ours, this was made up by the shore batteries which they had.

The small injury inflicted on our ships is attributed by our officers to the fact that the accurate fire of our large guns at long range demoralized the enemy before his smaller guns could be brought into action, as well as to the poor marksmanship of the Spanish gunners, which is directly traceable to the fact that they seldom have target practice.

It is particularly interesting to note the amount of ammunition fired by the ships of our squadron during the engagement. The reports show that the *Olympia* fired thirty-six 8-inch shell, 350 5-inch, 1,000 6-pounder, and 360 1-pounder; the *Baltimore* fired seventy-three 8-inch, 175 6-inch, 410 6-pounder, 169 3-pounder, and 692 1-pounder; the *Boston*, forty-eight 8-inch, 162 6-inch, 220 6-pounder, 256 3-pounder, and 420 1-pounder; the *Raleigh*, fifty-three 6-inch, 341 5-inch, 137 6-pounder, and 100 1-pounder; the *Concord*, 182 6-inch, and a proportionate amount of secondary battery

ammunition; and the *Petrel,* eighty-three 6-inch and her proportion of small caliber shots.

According to the best information obtainable the weight of the ammunition fired was *Olympia,* 26,500 pounds; *Baltimore,* 35,750 pounds; *Boston,* 28,200 pounds; *Raleigh,* 22,350 pounds; *Concord,* 20,000 pounds, and *Petrel,* 10,000 pounds, a total of nearly seventy-two tons of steel, or about one-half of the total ammunition supply of the squadron.

Another point of interest to the student of naval affairs is illustrated by the fact that, although the ships of our squadron had never drilled in concert, all the evolutions under fire were performed with an accuracy and precision that would have done credit to a peace time drill.

When we left Hong Kong the home

THE SPANISH FLEET

Name	Date	Material	Displacement	I.H.P.	Propulsion	Speed in knots	Torpedo tubes	Coal Supply	Total crew	Armament
								Tons		
Reina Christina	1886	I	3520	3970	S.S.	14	5	670	370	6-H. 16 c.m., 3 nf. 57 m.m., 2 nf. 42 m.m., 2 H 7 c.m., 6 hs. 37 m.m., 2–11 m.m.
Castilla	1881	W	3260	2600	S.S.	13	2	417	350	4 K. 15 c.m., 2 K 12 c.m., 4 K 7.5 c.m. 4 nf. 42 m.m., 4 hs. 37 m.m., 2–11 m.m.
Isla de Cuba	1886	S	1045	2200	T.S.	14	3	200	160	4 H. 12 c.m., 2 hs. 57 m.m., 3 hs. 37 m.m., 2–11 m.m.
Isla de Luzon	1886	S	1045	2200	T.S.	14	3	200	160	*idem.*
Don Antonio de Ulloa	1887	I	1160	1523	S.S.	12.5	2	195	160	4 H 12 c.m., 2 H. 7 c.m., 1–11 m.m., 4 hs. 37 m.m., 2 nf. 42 m.m.
Don Juan de Austria	1887	I	1160	1500	S.S.	14.5	2	250	180	*idem*
Velasco	1881	I	1152	1600	S.S.	15	2	220	150	3 A 15 c.m., 2 H 7 c.m., 2 nf. 25 m.m.
Marques del Duero	1875	I	500	550	T.S.	10	1	90	100	1 Pl. 16 c.m., 2 Pr. 12 c.m., 1 nf. 11. m.m.
General Lezo	1883	I	520	600	T.S.	9.5	1	70	120	2 H. 12 c.m., 1 H. 9. c.m., 2 nf. 25 m.m., 1 nf. 11 m.m.
Argos	1880	I	508	—	S.S.	8	–	135	90	1 H 7 c.m.
Calloa Captured May 12	1888	S	205	250	T.S.	9.7	–	32	35	1-H. 9. c.m., 2 nf. 11 m.m., 1 nf. 25 m.m.
Manila	1883	I	2000	750	S.S.	9	–	204	85	2 HK., 42 c.m.

NOTES

In the column "Material", steel is S., iron I., and wood W.
In the column "Propulsion", SS., is single screw, T.S. twin screw.
In the column "Armament," H is for Hontorio breech loading rifles, K. for Krupp, hs., Hotchkiss, nf. Nordenfeldt, A., Armstrong, Pl., Palliser, and Pr., Parrot. In each class the caliber is given in the metric measurement—c.m., centimeters, m.m., millimeters.

date of our latest mail was March 27. At that time the slogan "Remember the *Maine*," had not been invented and the warlike feelings of the crews of our ships on the Asiatic Station had not run toward that revengeful sentiment; so, although it contradicts every account of the battle I have yet seen in print, in the interests of truth it should be recorded that the signal, "Remember the *Maine*," was never hoisted on the *Olympia* nor was it "shouted in a hoarse chorus by officers and men."

The above account was written shortly after the battle and gives the impressions of a participant who served aboard the U.S.S. "Baltimore." In order to give the impressions of those who viewed the battle from the shore the following translation of an article which appeared in a daily paper at Manila three days after the battle should be of especial interest.

THE NAVAL BATTLE OF CAVITE

From the *Diario de Manila*, May 4, 1898

A Naval Surprise

When the enemy's squadron was sighted in perfect line of battle through the clouds of a misty dawn on the morning of the first of May, gloom and surprise were general among the people of Manila. At last these ships had strained their boldness to the point of appearing on our coast and defying our batteries, which showed more courage and valor than effect when they opened fire on the squadron. It needs something more than courage to make projectiles penetrate—indeed it does!

Every Man to His Station

The inequality of our batteries when compared with those of the squadron which alarmed the inhabitants of Manila at five in the morning was enough to transform the tranquil character of our tropical temperaments.

While ladies and children in carriages or on foot fled in fright to seek refuge in the outlying suburbs and adjacent villages around the Capital, from danger multiplied by their imagination, every man from the stately personage to the most humble workman, merchants and mechanics, Spaniards and natives, soldiers and civilians, all we repeat, sought their stations and put on their arms confident that never should the enemy land in Manila unless he passed over their corpses. Yet from the first moment the strength of the enemy's armor and the power of his guns demonstrated that his ships were invulnerable to our energies and armaments, the hostile squadron would never have entered our bay had not its surety been guaranteed by its manifest superiority.

Spectators and Observers

The city walls, the church towers, the roofs of high buildings, and all high places convenient for observation were occupied by those who were not retained by their military duties within the walls, on the bridges, or at the advanced posts. The slightest details of the enemy's ships were eagerly noted as they advanced toward Cavite in a line parallel with the beaches of Manila, as though they had just come out of the Pasig River. There were no gaps in the line but the curious public hardly realized the disparity between their great guns and the pieces mounted on our fortifications. Some had glasses and others were without, but all seemed to devour with their eyes these strangers who, while brave, were not called upon to show their courage since the range of their guns and the weakness of our batteries enabled them to preserve their impunity while doing as much harm as they pleased.

Remarks of the People

All who appreciated the impunity with which the hostile ships maneuvered, as if on a harmless parade, were full of such rage and desperation as belongs to the brave man who can make no use of his courage; to whom remains no remedy except an honorable death rather than a cowardly inactivity.

A soldier of the first battalion of Cazadores gazed at the squadron sweeping over the waters out of reach of the fire of our batteries, looked out and at the ships then toward heaven, saying, "If Holy Mary would turn that sea into land the Yankees would find out how we can charge in double time." And a crouching native staring out at the ships said, "Just let them come ashore and give us a whack at them."

On they stood at full speed in column of battle heading for Cavite with the decision due to a sense of safety and a firm assurance of success.

The Fight Seen From Manila

For more than an hour and a half the bombardment held in suspense those whose souls followed the unequal struggle, in which the Spanish ships went down with their glorious banners flying.

What was going on in the waters of Cavite? From Manila we saw through glasses the two squadrons almost mingled together in the clouds of smoke. This was not far from a triumph for our side, considering the weakness of our batteries. For, once alongside the enemy, the cry of "Boarders away!" and the flash of cold steel might have enabled our devoted seamen to disturb the calm in which watches and instruments were regulated and directing those engines of destruction. In the blindness of our rage how should we paint the heroic deeds, the prowess, the waves of valor which burst forth from our men-of-war? Those who fought beneath the Spanish flag bore themselves like men, as chosen sons of our native land who never measure forces, nor yield to superior force in the hands of an enemy; who would rather die without ships than live in ships which have surrendered.

To name those who distinguished themselves in battle would require the publication of the entire muster rolls of our ships, from captain to cabin boy. To these victorious seamen of ours we offer congratulations; laurels for the living; prayers for the dead; for all our deepest gratitude.

Since we cannot reconstruct the bloody scene which was exhibited last Sunday in the waters of Cavite, we will not attempt a description, which would only be a pale shadow of great deeds deserving a perpetual place in the pages of history.

When the hostile squadron turned toward Cavite, the crew of the steamer *Isla de Mindanao* heard the drums beating to quarters, and answered with enthusiasm, three rounds of cheers for the King, for the Queen, and for Spain, which echoed along our line.

Later, until a quarter to five, absolute silence reigned. Everything was ready. The idea of death was lost in ardor for the fray and every eye was fixed on the battle flags waving at our mastheads. In perfect and majestic order—why should we deny this?—the nine Yankee ships advanced in battle array. The *Olympia* bearing the admiral's flag, led the column followed by the other ships, steering at full speed toward Cavite. The *Olympia* opened fire and an instant reply came from the battery on the mole which kept on firing at five minute intervals, while the ironclad shaped her course for the *Reina Christina* and *Castilla*. Into both these ships she poured a steady and rapid fire seconded by the ships which followed in her wake. Another ship which directed a heavy fire on our line was the *Baltimore* and so the cannonade went on until a quarter to eight. At that moment the *Don Juan de Austria* advanced against the enemy intending to board the *Olympia*, and if a tremendous broadside had not stopped her self-devoted charge, both ships perhaps might have sunk to the bottom.

The captain of the *Reina Christina*, seeing that the resolute attempt of his consort had failed, advanced at full speed until withing 200 yards of the *Olympia*, aiming to attack her. Then a shower of projectiles swept the bridge and decks, filling the ship with dead and wounded.

Heroes and martyrs whom the nation will remember as long as it endures!

A dense column of smoke from the bow-compartment showed that an incendiary projectile, such as the law of God and man prohibits, had set fire to the cruiser. The ship, still keeping up her fire on the enemy, withdrew toward the arsenal, where she was sunk to keep her from falling into the hands of the Yankees.

The desperation of the men of the *Reina Christina* was aggravated by the sight of *Castilla* also in a blaze, from a similar use of incendiary projectiles.

The principal ships of our little squadron having thus been put out of action, the Yankee vessels, some of them badly crippled by the fire of our ships, and the batteries at Point Sangley, stood out toward Mariveles and the entrance of the bay, ceasing their fire and occupying themselves in repairing injuries until ten o'clock, when they began a second attack to complete their work of destruction.

In this second assault the fire at the arsenal was extinguished and they continued to cannonade the blazing gunboats.

One gunboat, which seemed to have nothing more venturesome to undertake, detached herself from the squadron and set to work to riddle the mail steamer *Isla de Mindanao*.

Now that the ships were in flames, the

Admiral, Senor Montojo, who had shown his flag as long as there was a vessel afloat, landed, and hostilities ceased.

The only Spanish ship which had not been destroyed by fire or by the enemy's projectiles, sunk herself so that she could in no wise be taken.

Such in broad outlines, which we cannot correct at this moment, was the naval battle of Cavite, in which the last glimpse of our squadron showed the Spanish flag.

A thousand sensational details have reached us, which we would reproduce gladly, after the necessary corrections, if our pen would serve for anything except to sing the glory of these martyrs of the nation.

Perhaps tomorrow or another day, with fuller knowledge of the facts, we can furnish our readers with many interesting details. Today we limit ourselves to a sketch of the grand picture which was unrolled before us on the first of May, begging our friends to excuse the defects which they may note.

The Killed and Wounded

Killed: The captain, chaplain, clerk, and boatswain of the *Reina Christina.*

Wounded: The captains of the *Castilla* and *Don Antonio de Ulloa;* the executive officer of the *Reina Christina;* a lieutenant of the *Don Juan de Austria;* the paymaster of the *Ulloa;* the second surgeon of the *Christina;* the surgeon of the *Ulloa,* and chief engineers of the *Christina* and *Austria.*

Vigilance

By naval authority the most careful watch was kept in the river as well as on the coast to secure the defense of the port.

Batteries

The gunners of the batteries defending Manila and Cavite showed the highest degree of energy and heroism. Everyone applauds the brave artillerymen who, by their calmness and skill, did all that was possible with the guns assigned to them, allowing for their deficiencies and imperfections.

The battery that did most harm to the enemy was the one on Point Sangley made up of Hontorio guns. From one of these guns came the shot which the *Boston* received, while four ships which had altogether sixty-five guns were pouring their fires on this battery to reduce it to silence. One gun having been crippled the other kept on playing, firing whenever damage could be done and avoiding waste of ammunition.

To one of its shots is attributed the hurt which turned the *Baltimore* from the fight. This gun must have greatly annoyed the Yankees to judge by the efforts they made to silence its fires, following it up until six gunners had been killed and four wounded.

On this account it is proposed to demand the bestowal of the laurel wreathed cross of San Fernando to the valiant gunners who served this battery.

The Luneta battery at Manila, which assailed the Yankee ships with much vigor, was the object of the enemy's special attention as he stood past the fortifications of Manila, heading for Cavite.

Guns were also mounted at the entrance of the bay on Corregidor and Caballo Islands, on El Fraile rock, on the south shore at Point Restinga and at Mariveles, Punta Gorda and Point Lasisi on the north shore. The guns on Corregidor Island were of about 6-inch caliber; similar guns were mounted on the rock and on Point Restinga. The other batteries had guns of smaller caliber and short range.

Kind Treatment

The Spanish Club, ever earnest in remedying misfortune, gave liberal help to the refugees who survived from our ships of war.

Bread and Water

Doubtless the Civil Commission has arranged to secure supplies for the city, but it is certain since Sunday there has been great scarcity of everything, and speculators have got what prices they cared to ask for articles of prime necessity.

Already people are growing calmer and the shops are open, and it is to be expected that Manila will go on resuming her usual life and animation.

The Country Responds

The great masses of the rural population of the Philippines, as well as the leaders of the nation, have responded like loyal sons of Spain, sharing our pains and assisting in our labors.

Telegram

The Admiral, Senor Montojo, has received a telegram of congratulation from

the Minister of Marine who, in his own name, and in the name of the Queen of Spain, felicitates the Navy of this Archipelago for gallant behavior on the day of Cavite. These are the terms of the telegram referred to: "Honor and glory to the spanish fleet which fought so heroically in the bay."

No Papers

After two days of silence, in which our paper failed to see the light by reason of exceptional circumstances occurring in Manila, and well known to all the public, we return to our regular issues trusting in the good will of our subscribers.

The details of the battle as viewed from the Spanish fleet may be gained from the following translation of an article which appeared in "El Imparcial," a daily paper of Madrid, on July 22, 1898, giving extracts from the official report of Admiral Montojo, the commander-in-chief of the Spanish fleet during the battle.

THE DISASTER OF CAVITE

Official Report

La Correspondencia has received from Manila an extract from the official report of the disaster of May 1, by Admiral Montojo. Its text reads as follows:

Departure for Subig

April 25 at 11 P.M., I left Manila Bay bound for the port of Subig with the squadron composed of the cruisers *Reina Christina, Don Juan de Austria, Isla de Cuba, Isla de Luzon,* dispatch boat *Marques del Duero,* and the wooden cruiser *Castilla,* which could only be reckoned as a floating battery incapable of any movement or activity, principally on account of the bad condition of her hull.

The next morning on arrival at Subig I conferred with Captain Del Rio, who, while unable to tranquilize me in regard to the defensive works, assured me they would be completed with promptness.

Meanwhile the cruiser *Castilla,* after the short passage which she had made, was making much water through the bearings of the shaft and the after planking. Work was going on night and day to stop the leaks with cement, and the ship was finally made almost tight, but it was absolutely impossible to use her engine.

On the morning of the twenty-seventh I took out the ships to cover the entrance to the port of Subig. The *Castilla* lay off the northwest point of Isla Grande to defend the western channel with her fire, since the eastern channel had been closed by the hulls of the *San Quentin* and two old merchant vessels which had been sunk.

With the greatest disgust I then learned that the guns which ought to have been mounted on the island had not been installed after a delay of a month and a half, which surprised me as the land batteries installed by the Navy, overcoming many difficulties, under the intelligent direction of the Colonel of Marine Artillery, Senor Garces, and that of Lieutenant Benavente of the Navy, were ready to open fire twenty-four days after work had begun.

I was also disgusted with the lack of confidence shown in the small number of torpedoes which had been laid down.

The entrance being defended neither by torpedoes nor by batteries on the island, the squadron with its scanty means of action had to dread the attack of the American forces in twenty fathoms of water and therefore with almost a certainty that not only our ships would be destroyed but also that their crews could not be saved. The hope still remained that the Americans might not come to Subig and might give us time to make better preparations; but the next day I received from the Spanish Consul at Hong Kong the following telegram: "The enemy's squadron left Mirs Bay at two this afternoon, and according to confidential information will proceed to Subig to destroy our squadron and later will go on to Manila."

This telegram showed that the enemy knew where my squadron was to be found and the defenceless state of the port of Subig.

The same day, April 28, I called a council of commanding officers, and all, except Del Rio, the commandant of the future arsenal, pronounced that the situation could not be sustained and that we ought to proceed to Manila Bay and accept battle there under less unfavorable conditions.

Return to Manila

The plan of placing our ships near the city of Manila was condemned because far

from protecting the town they would provoke the enemy to bombard it, when it would infallibly have been destroyed given the weakness of its defenses. It was unanimously decided that we should take positions in Canacao Bay in as shoal water as possible in order to combine our fire with that of the batteries on Sangley Point and on board the *Ulloa*.

I immediately ordered Del Rio to concentrate his forces at the best strategic point of the arsenal and to make arrangements for burning the coal at the depot in time to prevent it falling in the enemy's hands; I sent the *Don Juan de Austria* to Manila to collect as many lighters as possible filled with sand to serve as a protection for the water line of the *Castilla* while motionless against the enemy's shells and torpedoes. At half past ten of the twenty-ninth, I left Subig with the vessels of my little squadron, the *Castilla* being towed by the transport *Manila*.

On the evening of the same day we anchored in Canacao Bay in twenty-six feet of water, and on the morning of the next, April 30, there were anchored in line of battle with springs on their cables, the *Christina, Castilla, Don Juan de Austria, Ulloa, Luzon, Cuba,* and *Marques del Duero,* while the transport *Manila* went into Bacoor Bay to join the *Velasco* and the *Lezo* which were under repairs.

At seven in the evening I received a telegram from Subig announcing that the enemy's squadron had entered the harbor at three to reconnoiter, doubtless in search of our ships, and that it had left heading for Manila.

The mail steamer *Isla de Mindanao* came over from the bay and I advised her captain to try to save his ship by starting at once for Singapore, since the enemy could hardly reach the mouth of the bay before midnight. As he had no authority from the Trans-Atlantic Company he did not dare to do this and I then told him to anchor in shoal water as near Bacoor as possible.

At midnight the fire of guns was heard from Corregidor, and at two in the morning I received a telegram saying that the American ships had opened fire on the batteries at the entrance and had exchanged several rounds with them.

I notified the commandant of the arsenal, Senor Garcia Pena, so that he might be ready, and I ordered the guns to be loaded and all officers, seamen, and soldiers to go to their stations for battle, ready to receive the enemy.

The preceding covers all that happened between my departure for Subig and the arrival of the American squadron in Manila Bay.

All the ships had been painted dark gray and had been stripped of their yards, their light spars, and their boats, in order to avoid dangers due to shells and sparks; all the anchors had been buoyed in readiness for slipping the cables at a moment's warning.

At four in the morning the signal was made to beat to general quarters; at a quarter to five the *Austria* signaled "The enemy's squadron," and a few minutes later they were seen from the deck in rather confused order; in a column parallel with our line and about 6,000 meters distant, the flagship *Olympia* leading the line, followed by the *Baltimore, Raleigh, Boston, Concord, Helena, Petrel,* and *McCulloch,* the transports *Zafiro* and *Nanshan* remaining outside the line.

The force of these ships (not counting the transports which did not take part in the fighting) amounted to 21,410 tons, 49,290 horsepower, 163 guns (many of them rapid fire), 1,750 men in their crews, and average speed seventeen knots.

The force of the five ships which were alone effective on our side amounted to 10,111 tons, 11,200 horsepower, seventy-six guns (very few rapid fire), 1,875 men in their crews, and twelve knots at full speed.

Fire from Shore Batteries

At five the Sangley Point battery opened fire and the first two shots fell short and to the left of the leading ship; no reply was made to these shots by the enemy whose principal objective was the squadron.

This battery had only two guns mounted; Ordonez guns of fifteen-centimeter caliber, of which only one could be fired in the direction of the hostile fleet.

In a few minutes one of the batteries of Manila opened fire and at a quarter past five the squadron also opened in obedience to signal, meeting an immediate response from the enemy, and the combat became general. Springs and cables were slipped and engines started ahead to avoid being surrounded by the enemy.

The Battle

The Americans kept up a most rapid fire and we saw ourselves assailed by innumerable projectiles; moreover, the three leading cruisers of the enemy's line devoted themselves almost exclusively to firing on the *Christina* which bore my flag. Shortly after the beginning of the action a shell burst in the forecastle, disabling all the crews of the four rapid-fire guns and driving splinters from the foremast which wounded the helmsman, who was steering on the bridge, so that the wheel had to be taken by Lieutenant Don Jose Nunez who, with calmness worthy of the highest praise, continued to steer until the end of the action. Meanwhile, a shell burst in the orlop deck setting fire to the lockers of the crew who fortunately succeeded in putting out the fire.

The enemy reduced his distance from us, and, improving his aim, covered us with a hail of rapid-fire projectiles. About half past seven a shell completely destroyed the steam steerer; I ordered the hand wheel to be connected. The ship not being under control during this interval which was long, another shell exploded aft, putting nine men out of action. Another carried away the mizzen truck and gaff, bringing down the ensign and my flag, which were immediately replaced. Another shell burst in the wardroom, turned into a bloody hospital, and destroyed the wounded who were there under treatment; another burst in the after ammunition room, filled the compartments with smoke and prevented the coupling of the hand wheel. It being impossible to keep down the fire, this ammunition room had to be flooded when the cartridges were beginning to explode.

Amidships various rapid-fire projectiles of small caliber had pierced the funnels and a large shell had penetrated the superheater, putting out of action a gunner's mate and twelve men who were serving the guns; another disabled the starboard bow gun, while the fire aft was increasing and the fire forward was renewed by a shell which penetrated the side and burst in the orlop.

The broadside guns which we were fighting were not seriously injured, and kept up their fire, and a single gun captain, assisted by a petty officer, the only ones who remained unhurt, kept on firing the guns as they were loaded by seamen who had taken the place of the regular crews who were all disabled.

Destruction of Our Ships

The ship no longer being under control by the helm, and her sides, funnels, and spars being riddled by shot, and wrapped in the flames of two conflagrations; half her crew, including seven officers, disabled; I gave orders to sink the ship and abandon her, before the explosion of the magazines and shell rooms; making signal at the same time to the *Cuba* and *Luzon* to approach and pick up the rest of the crew; which service was performed by the boats of these ships, assisted by others from the *Duero* and the arsenal.

I quitted the *Christina* accompanied by my staff after removing the ensign, and, filled with profound grief, I hoisted my flag on board the cruiser *Isla de Cuba*. When many men had already been saved from the unfortunate ship, a shell killed her heroic captain, Don Luis Cadarso, who was directing the rescue of the crew.

The *Ulloa*, who also defended herself with tenacity, using the last pair of guns available, was sunk by the holes made along her water line by the enemy's projectiles; her captain and more than half of her scanty crew, which was only large enough to serve the two guns mentioned above, were disabled.

The *Castilla*, which fought heroically, had all her guns put out of action except one on the poop which gallantly kept up the fire; riddled by shot and in flames from the enemy's shells she was sunk and abandoned by her crew in good order under the able direction of her captain, Don Alonzo Morgado. The losses of this ship were twenty-three killed and eighty wounded.

The *Austria* with numerous injuries and considerable losses stood in to succor the *Castilla*.

The *Luzon* had three guns dismounted and some small injuries to her hull, the *Duero* had one engine crippled as well as her twelve-centimeter bow gun and one of her sponsons.

At eight o'clock in the morning, the enemy's squadron having suspended its fire, I ordered our remaining ships to take positions in Bacoor Bay and to fight them to the last extremity, when they should be sunk rather than surrendered.

At half past ten the enemy returned forming a circle to destroy the arsenal and my remaining ships, and opening a horrible fire upon them, to which we replied with the few guns which we still had mounted.

The time having now arrived for the final resource of sinking the ships, this was effected, taking care to save the ensigns, distinguishing pennants, money in safes, small arms, breech plugs of the guns, and signal codes.

Afterwards I proceeded with my staff to the Convent of Santo Domingo at Cavite to have myself treated for a contused wound received in the left leg, and to telegraph a brief report of the battle, its preliminaries and its results.

The Admiral's Judgment

It remains only for me to state that all the captains, officers, engineers, warrant officers, gunner's mates, seamen, and marines have been rivals in sustaining with honor the reputation of the Navy on this melancholy occasion.

The weakness of the ships of which my little squadron was composed, the deficiency of men of all classes, especially of gunner's mates and seamen gunners, the unfitness of some acting engineers, the great scarcity of rapid-fire guns, the triple force of the enemy, and the lack of all protection for most of my ships—all combined to render more cruel the sacrifice we made on the altars of our country to avert the horrors of a bombardment of the almost defenseless city of Manila, with the conviction that to measure our feeble forces with the much greater strength of the enemy must lead us to almost certain death and the destruction of all our ships.

Our losses, including those at the arsenal, amount to 381 disabled, including both killed and wounded.

The General Mess *of a* Destroyer

By COMMANDER R. E. ROGERS, *U. S. Navy*

MOTTO: *The burnt child fears the fire.*

THE Navy Regulations require a monthly inventory of the provisions of the general mess. If this is taken carefully and computed correctly, *and entered in the ration record correctly,* a general mess disaster is unlikely. Not impossible, however, for if the invoice of a large consignment of dry provisions from the tender be overlooked, the general mess is still likely to be stranded, or run upon a rock or shoal.

As a matter of stern necessity I was recently constrained to perform the duties of "commissary officer" of a destroyer, and while I learned nothing that I should not have known previously, I believe the simple system I employed will fairly insure the Government's money's worth, and will, in any case, prevent any serious "over-expenditure." The bookkeeping I recommend does not, of course, replace that required by the Navy Regulations, but is in a degree additional to it.

It is required that a separate page of the commissary record book be kept for each contractor each month. Assuming that for September the firm of Smith & Doe has the contract for butter, cheese, and eggs, this page will appear as below.

SMITH & DOE, NEW YORK, SEPTEMBER, 1927

		Butter $.28 per lb.	Cheese $.34 per lb.	Eggs $.30 per doz.
Sept. 3	Ordered	56	50	100
	Received	*54**	*51**	*100**
Sept. 20	Ordered	56	50	100
	Received	*56**	*50**	*96**

* Red ink.

And so to the end of the month. When the last order for the month has been received, this page can be footed up by adding red ink entries.

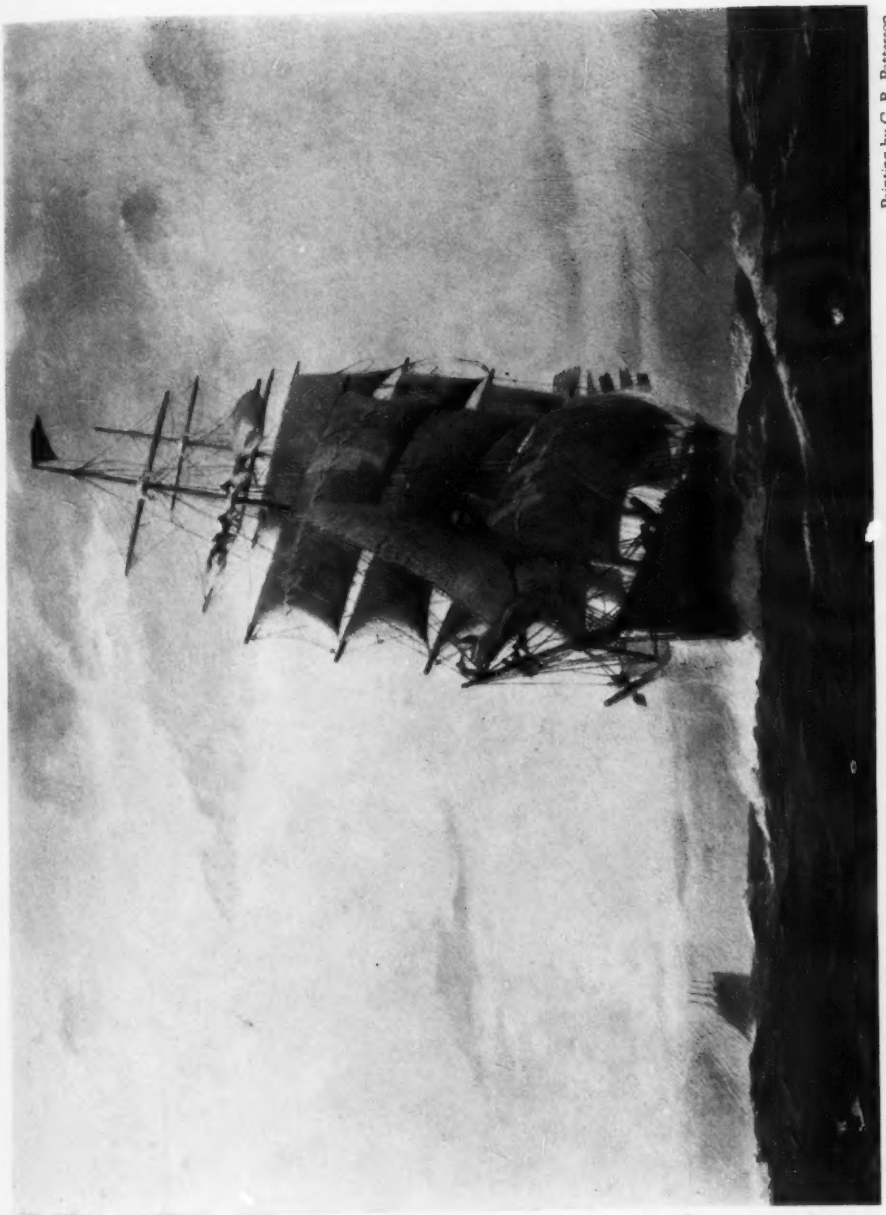
Total	110	101	196
Value	$30.80	$34.34	$58.80
Amt. of bill	$123.94		

The bill is thus checked before it is received. As to the keeping of this page, the orders are entered, in black ink, simultaneously with the preparation of the order to the dealer. The receipt is entered, in red ink, from the duplicate signed delivery slip immediately after the officer of the deck has weighed and logged the delivery. As to the checking of stores upon receipt, unless you have a set of scales, and unless you use them, your maximum general mess efficiency for the cruise is not likely to exceed seventy-five per cent. A deplorable condition, but as Nelson was wont to say, "Such things are."

Nor should issues from tenders or supply depots be taken for granted. The Regulations do not require the officer of the deck to check and log these, but the captain may so require, and it should be done that way, unless the commissary officer meets all such deliveries. The check-off list used by the officer counting these stores is compared to the requisition, and "filed" with it. For filing these, I found it convenient to keep the requisition, the check off, and the duplicate invoice together in one large envelope, to cover the month's transactions. Meanwhile each receipt of provisions from supply officers is entered in pencil on a ration record form. Now as the monthly provision deliveries from contractors are closed, the amounts of these are also entered on this pencil copy of the ration record. As soon as the actual bills are checked, the ration record may be typed. The commissary steward should be notified of the result. He is *not* to have a hand in the preparation of any part of the ration record.

A correct monthly inventory is essential. If the captain feels that it is incompatible with his dignity and prestige to personally assess his tinned bacon and coffee, I earnestly recommend that a board of three officers be assigned this duty, and that the typed copy of the inventory be checked with the board's findings.

Let the ration record be correct to the last bean. Purchases by the wardroom mess should be scrupulously correct. If the wardroom inadvertently fails to get charged for a cake of ice, my impression is that someone is very likely to inadvertently walk away with the remaining contents of the ice box.



"SIGNALLING A PILOT," OUTSIDE SAN FRANCISCO

Painting by C. R. Patterson.

Copyright, Brown and Bigelow, St. Paul, Minn.

Courtesy of R. J. Arnold

FLEET AT ANCHOR, MONTEREY, CALIFORNIA, 1908

At the time this picture was taken, the Wright brothers had just demonstrated that man could fly. See next page.

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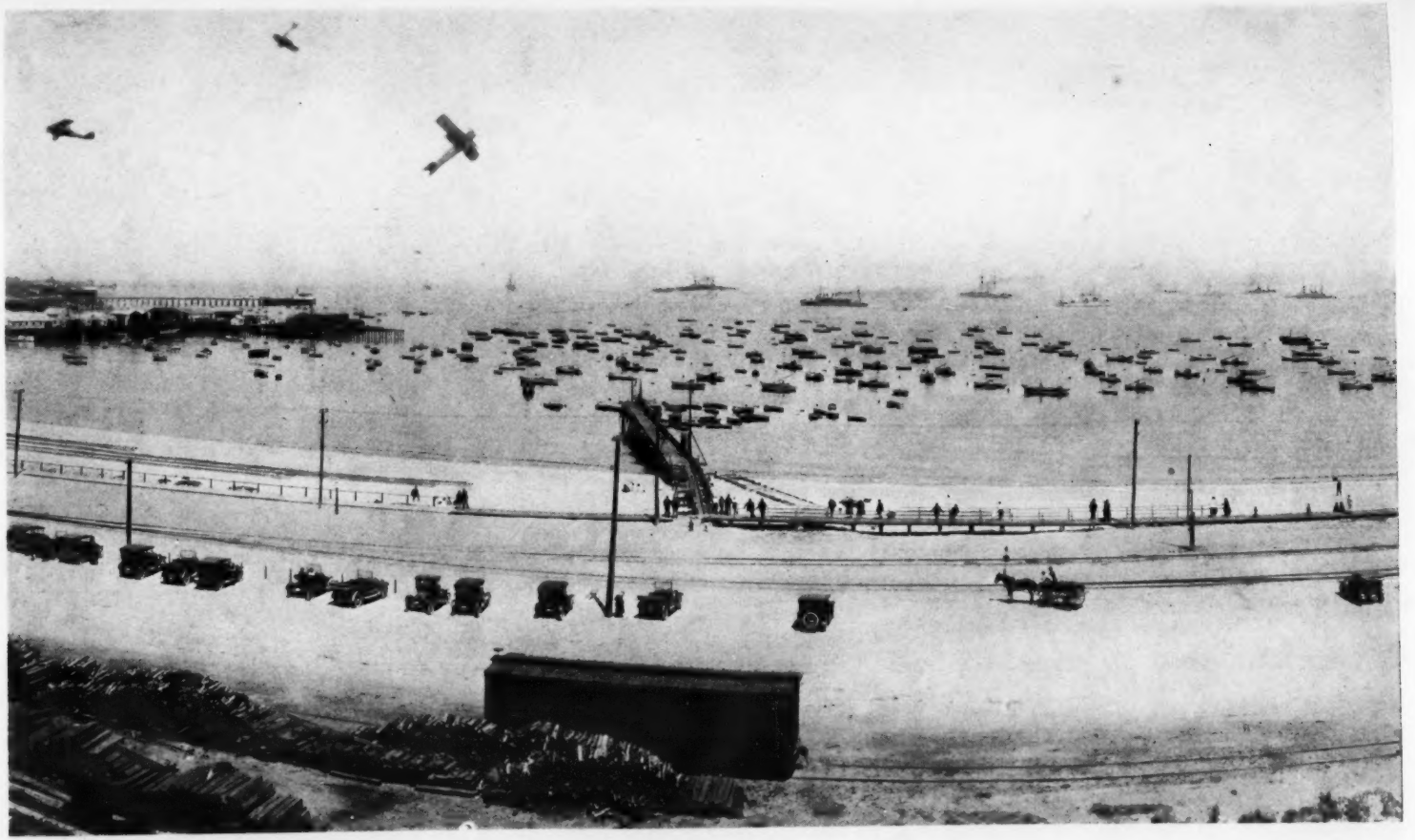


Courtesy of Monterey Chamber of Commerce

FLEET AT ANCHOR, MONTEREY, CALIFORNIA, 1928

Today the Fleet's airplanes are a very important part of its equipment.

Courtesy of Miss M. K. MacFall

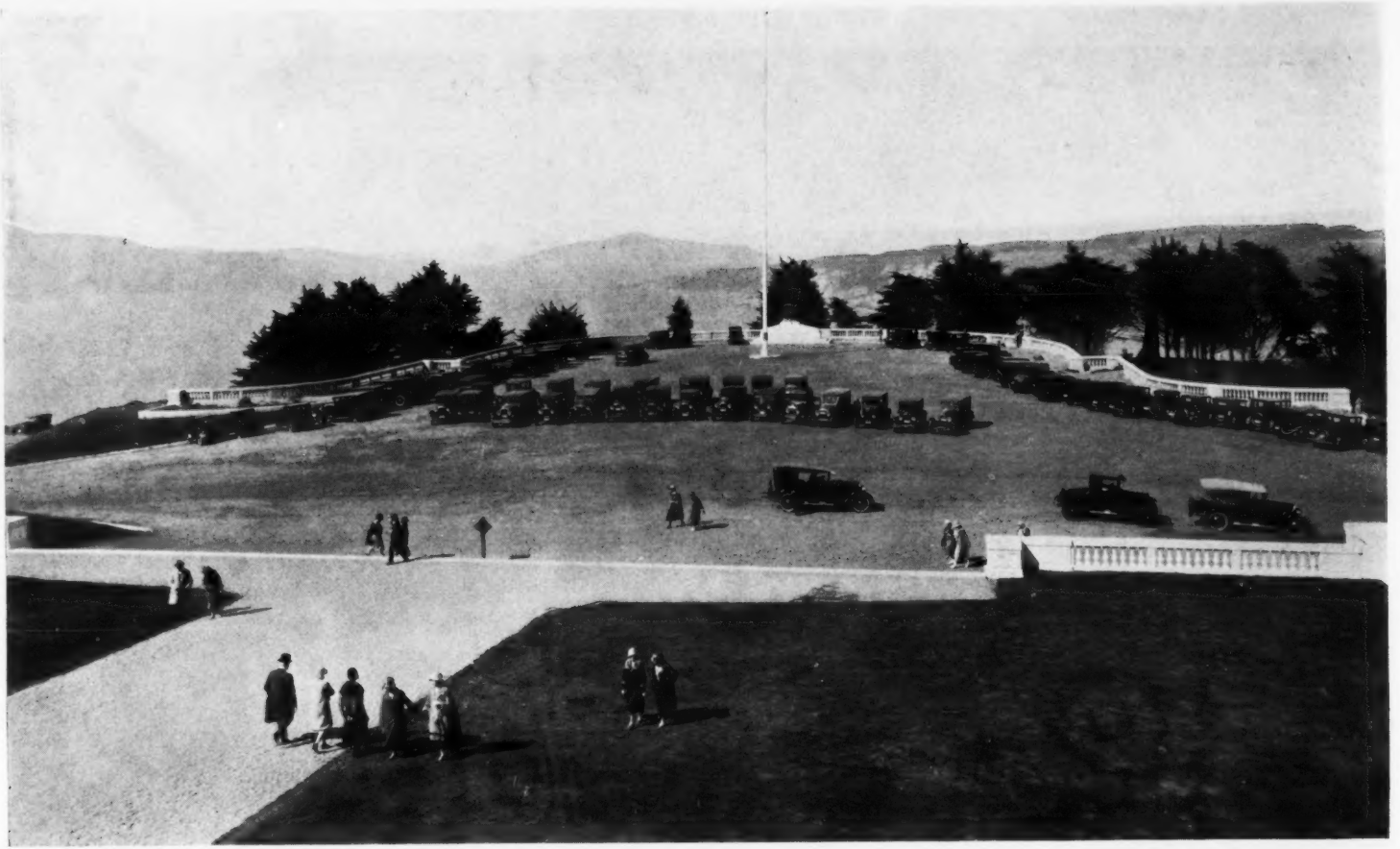
THE FLEET ENTERS THE GOLDEN GATE, 1908

The sixteen battleships and six destroyers that started from Hampton Roads are seen standing past Point Bonita. Two battleships of the Pacific Fleet have also joined. Inside the Gate, the cruisers of the Pacific Fleet joined, making this our most powerful naval concentration up to this time.

International Newsreel

THE GOLDEN GATE

A view of the entrance to San Francisco Harbor from Lincoln Park Municipal Golf Course, San Francisco.



International Newsreel

LINCOLN PARK, OVERLOOKING THE GOLDEN GATE
View from American Legion Memorial, San Francisco.

View from American Legion Memorial, San Francisco.

Courtesy of U. S. Army Air Service

ALCATRAZ ISLAND, SAN FRANCISCO BAY

Courtesy of San Francisco Chamber of Commerce

THE FLEET APPROACHES ITS ANCHORAGE, 1908

Note the crowds waiting to welcome the fleet after its successful voyage from Hampton Roads, Virginia.

Courtesy of San Francisco Chamber of Commerce

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Note the crowds waiting to welcome the fleet after its successful voyage from Hampton Roads, Virginia.

Courtesy of San Francisco Chamber of Commerce

THE FLEET AT ANCHOR, SAN FRANCISCO, (MODERN VIEW)

Compare the San Francisco of today with that of twenty years ago.

Courtesy of U. S. Army Air Service

THE PRESIDIO

Guarding the entrance to San Francisco Bay. Note the Palace of Fine Arts in the foreground.

Guarding the entrance to San Francisco Bay. Note the Palace of Fine Arts in the foreground.

Courtesy of U. S. Army Air Service

ART MUSEUM IN GOLDEN GATE PARK, SAN FRANCISCO

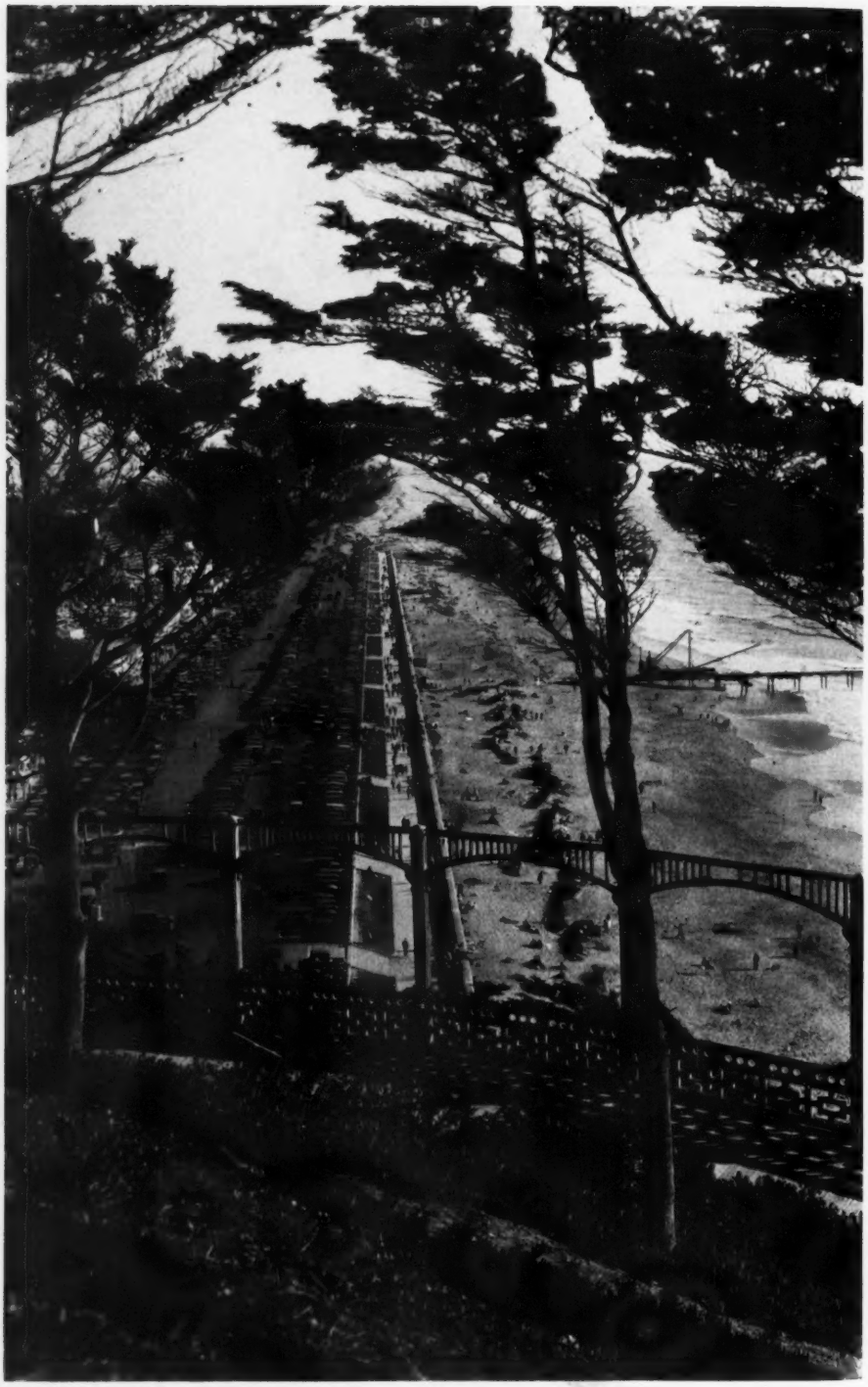
International Newsreel

PALACE OF FINE ARTS
All that is left of the Pan-American International Exposition, San Francisco.

All that is left of the Pan-American International Exposition, San Francisco.

International Newsreel

CIVIC AUDITORIUM, SAN FRANCISCO



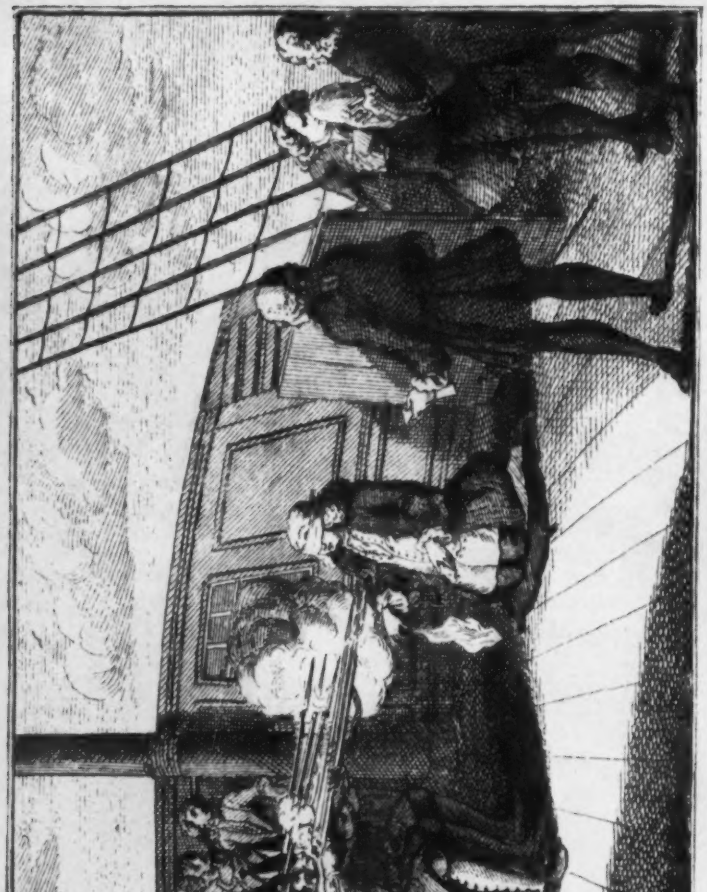
International Newsreel

OCEAN BEACH, SAN FRANCISCO
View of this famous bathing beach from Sutro Heights.

Courtesy of Russell Palmer, Esq.

Painting by C. R. Patterson

OLD AMERICAN "WOODEN" SHIPS AT ANTIOCH, CALIFORNIA
The barks *B. P. Cheney*, *Pactolus*, *St. Katherine* and *Hecla*.



THE SHOOTING OF ADMIRAL BYNG.

From a contemporaneous print. By courtesy of the British Museum.

The Tragedy *of* Admiral Byng

By Rear Admiral Livingston Hunt, *(S.C.), U. S. Navy (Retired)*

THE presence of Braddock and a British army in the woodlands of western Pennsylvania in July, 1755, may seem to some to have no connection with the occurrence of a sea fight in the Mediterranean in the following spring between the French and British fleets, off Minorca; yet both events were part of one and the same series of hostilities known in England as the Seven Years War, and in the American Colonies as the French and Indian War. Frequent friction between the colonies of France and those of Great Britain on this side of the Atlantic had preceded the official declaration of war between the parent countries in 1756, and this friction had for two years taken the shape of actual and bloody hostilities on our western frontier. We must therefore realize that George Washington, a Lieutenant Colonel aged twenty-four stationed in Winchester, Virginia, in the spring of 1756, and the Honorable John Byng, Admiral of the Blue, aged fifty-two, in command of a British fleet in the Mediterranean, were both Englishmen engaged at the same time in different parts of the world in fighting the battles of His Britannic Majesty against the French. This community of purpose and of occupation on the part of the two men cannot fail to bring the story of Byng's career well within our interest. It will reveal that the strategy and tactics of this British war make the professional acts of Byng worthy of American study, quite independently of the absorbing human interest which attaches to his strange and cruel ending.

John Byng was the son of an able father, George Byng, Viscount Torrington, also an admiral, whose deeds against the Spaniards in 1704 and 1718 won him distinction. The son John, born in 1740, was treated by the Lords of the Admiralty with an indulgence that savored of favoritism during most of his career. They too allotted him soft and pleasant berths, and, largely on account of his father's name and its influence, kept him in the waters of the Mediterranean to an unwarranted extent. It can be safely asserted that he had not earned the honor of being chosen to the command of the British Mediterranean fleet when, on March 11, 1756, the Admiralty ordered him to proceed to the neighborhood of Minorca (then a British possession), for the purpose of defending the island against the possible attack of a French fleet. It will be remembered that at this time the ambitious designs of Frederick the Great of Prussia had caused an alliance against him of Russia, Austria and France; and that Great Britain had taken the side of Prussia solely for the purpose of checkmating the French policy of acquiring territory in America and in India. One of the side issues of the French scheme included an early attack on the British island of Minorca in the Mediterranean, with its fortified harbor of Port Mahon, but the British government could not be fully convinced of this. It kept a fleet of twenty-seven ships of the line in the English Channel, fearing an invasion of England itself by the French troops gathered in Normandy, and the transports at Boulogne, Havre and Calais. It believed that the rumored preparation of a large French fleet at Toulon forecast an expedition to America, or perhaps to Gibraltar, rather than against the little island of Minorca. Hence the following uncertain directions in the British Admiralty's instructions to Admiral Byng on March 30, 1756:

> Whereas the King's pleasure has been signified to us by Mr. Fox, one of his principal secretaries of state, that, upon consideration of the several advices which have been received relating to the supposed intention of the French to attack the island of Minorca a squadron of ten ships of the line do forthwith sail for the Mediterranean, under your command. . . . . You are hereby required and directed immediately to put to sea . . . . and proceed with the utmost expedition to Gibraltar. Upon your arrival there you are to

inquire whether any French squadron is come through the straits; and if there is, to inform yourself as well as possible of their number and force; . . . . and, as 'tis probable they may be designed for North America . . . . you are immediately to take the soldiers out of so many ships of your squadron as, together with the ships at and going to Halifax, will make a force superior to the said French squadron . . . . and then detach them under the command of Rear Admiral West, directing him to make the best of his way off Louisburg . . . . to cruize off the said place and the entrance of the Gulf of St. Lawrence, and use his utmost endeavours to intercept and seize the aforesaid French ships. . . . . If, upon your arrival at Gibraltar, you shall not gain intelligence of a French squadron having passed the straits, you are then to go on, without a moment's loss of time, to Minorca, or if in consequence of such intelligence, you shall detach Rear Admiral West as before directed, you are to use equal expedition in repairing thither with the ships which shall remain with you, and if you find any attack upon that island by the French, you are to use all possible means in your power for its relief; if you find no such attack made, you are to proceed off Toulon, and station your squadron in the best manner you shall be able, for preventing any French ships getting out of that port, or for intercepting and seizing any that may get out; and you are to exert the utmost vigilance therein, and in protecting Minorca, and Gibraltar, from any hostile attempt.[1]

In order for the reader to be in possession of the full purport of Admiral Byng's orders at this time, the additional instructions from the Admiralty, dated one day later, should be quoted:

Whereas the King has been pleased to direct that the Royal Regiment of Fuzileers, commanded by Lord Robert Bertie should serve on board his majesty's ships in the Mediterranean, and that the said regiment should be landed in Minorca, in case the Governor, or Commander-in-Chief of that island shall think it necessary for its defense, and the Governor of Gibraltar having orders, in case a farther reinforcement shall be necessary at Minorca to make a detachment equal to a battalion from his garrison, which detachment the admiral . . . . is to convoy to Minorca . . . . We do, in pursuance of his majesty's pleasure . . . . hereby require and direct you to pay due obedience to his majesty's aforesaid directions, by landing Lord Robert Bertie's regiment, in case the island of Minorca shall be attacked and, upon consultation with the governor the same shall appear to be necessary. . . . .[2]

There was, of course, no French fleet in the neighborhood of Gibraltar on May 2, when Admiral Byng arrived there with his small force of ten ships, for the French fleet (of twelve ships of the line) had sailed from Toulon for Minorca on April 10, convoying no fewer than 150 transports containing an army of 15,000 men, all of whom had been properly disembarked on April 17. The British garrison on the island, consisting of a fort known as St. Philip's Castle, defended by 3,000 soldiers, was now invested by this large French force under the Duke de Richelieu, and the harbor of Port Mahon was blockaded by the French fleet under Admiral the Marquis de la Galissoniere. This unexpected and serious news was received by Admiral Byng in Gibraltar with feelings of discouragement which to us today do not seem unjustifiable. In a letter to the Lords of the Admiralty, dated May 4, or two days after his arrival, he says:

I am firmly of opinion from the great force they (the French) have landed, and the quantity of provisions, stores and ammunition of all kinds they have brought with them, that the throwing men into the castle will only enable it to hold out but a little time longer, and add to the numbers that must fall into the enemy's hands, for the garrison in time will be obliged to surrender unless a sufficient number of men could be landed to dislodge the French or raise the siege. However I am determined to sail up to Minorca with the squadron where I shall be a better judge of the situation of affairs there, and will give General Blakenay (the military governor of the island), all the assistance he shall require, though I am afraid all communication will be cut off between us. . . . . Their Lordships will observe the strength of the French Ships. . . . . It is to be apprehended when they (the French) have got all the ships they possibly can ready for service, that they may think of turning their thoughts this way (i. e. to Gibraltar). If I should fail in the relief of Port Mahon I shall look upon the security and protection of Gibraltar as my next object, and shall repair down here with the squadron, and hope their Lordships will approve of that measure. . . . . I am sorry to find upon inquiring of the naval officer here that there are few or no stores. . . . . Many of them (i. e. the ships) are in want of repairs; . . . . I fear from the inconveniences we shall meet with here, there will be great difficulty in keeping the ships clean.[3]

The salient feature of the foreign naval policy of England at this moment may be described as neglect of the Mediterranean and the distribution of her naval forces elsewhere. Yet England had in all about 130 ships of the line, while France had but forty-five.[4]

The reader is now asked to pass over the intervening time until we reach the date

[1] The Trial of the Hon. Admiral John Byng, as taken by Mr. Charles Fearne, London 1757. pp. 4 and 5.

[2] *Ibid*, p. 5.

[3] *Ibid*, pp. 5 and 6.

[4] *Influence of Sea Power on History*, Mahan, p. 74.

of May 20 and our mind's eye rests upon a tract of the open sea about nine or ten miles to the southwest of Minorca. Into this space comes sailing, in a three-knot breeze in line ahead, his Britannic majesty's Mediterranean fleet, now increased to thirteen ships of the line, with the admiral's division containing seven ships, and the rear admiral's division, under Temple West, Esq., containing six ships. Each ship carries from sixty to ninety guns and a crew of 400 to 700 men, so that the whole fleet has a strength of 848 guns, and over 6,000 men. It is 1:30 P.M. and about six hours since another fleet, almost the same in numbers (there were twelve large ships), in size, and in general appearance, had been descried by Admiral Byng on the southeastern horizon. This was the French fleet, the enemy; the very ships that he had been looking for, and towards which he now steered his course. In guns they were of the same strength as the British, and in men they were 650 more—almost a perfect match for a fight to a finish.

The movements of the British fleet in the battle that was to ensue are best described in Admiral Byng's own language.[5] His line of ships, about a fifth of a mile apart, were sailing to the southeast, with the wind about abeam, from the southwest. The enemy were to leeward and likewise sailing in a straight line of battle ahead, but in the opposite direction, towards the northwest. The distance between the two hostile lines as they drew abreast of each other was from one to three miles, the British van being considerably farther away from the enemy's rear than the British rear was from the enemy's van. In other words, they were not parallel, although Admiral Byng should have made them so. Admiral Byng kept on for a few minutes, until his van passed the rearmost of the French ships. "At a half an hour after one," he writes, "our van then stretched a little beyond the enemy's rear."[6] His plan now was to tack all his ships together toward the enemy; reverse his course, and sail alongside of them and in the same direction with them. His idea in stretching beyond them was to enable his ships, after turning, to approach and attack the enemy's ships on a slant, and thereby not be exposed to a raking fire, which would be the case if his ships bore down at right angles to the French line. His account continues: "I made the signal for the fleet to tack altogether; and soon after we tacked in that manner and kept in line on the other tack." Both fleets were now on the port tack, sailing to the northwest, but as already indicated, with the new British rear farther away from the French rear than it should have been for a simultaneous attack by the whole British line on the French line. Counting from the leading British ship, the *Defiance*, to the *Kingston*, or thirteenth vessel, the length of the British line was about three and a half miles, and the same stretch of distance applies to the French fleet. At two o'clock Admiral Byng noticed that his new van was not approaching near enough to the enemy, and he says: "I made the signal to lead to starboard with one gun, and soon after another gun, to put the leading captain in mind of his instructions, who I perceived did not steer away with the enemy's leading ship agreeable to the nineteenth article of the *Fighting Instructions* which directs, 'If the admiral and his fleet have the wind of the enemy and they have stretched themselves in line of battle, the van of the admiral's fleet is to steer with the van of the enemy's and there to engage them.' "[7] After ten minutes of sailing without yet coming to action, the French van obviously awaiting a nearer approach of the English, Admiral Byng writes: "Observing that the leading ship did not steer away sufficiently, I bore away about two points more than the ships ahead of me." (Admiral Byng's ship was the *Ramillies*, the tenth ship of the whole line, and the fourth of the rear division.) For another ten minutes the van did not yet steer sufficiently to starboard to come to blows with the enemy, and he writes: "I therefore thought it necessary [at twenty minutes after two], to make the signal to engage, to bring on the action and to empower the ships to fire respectively as they got within a proper distance."[8] At this time the foremost ships of

[5] Of the many accounts of this noted action it is the defect of naval historians, probably due to lack of space, to neglect the employment of Admiral Byng's own words as used in his defense later before a court-martial. His acts are therein more picturesquely, more ably, and more quaintly presented to the reader than they can be in a modern and conventional *résumé* of them. L.H.

[6] *Trial of the Hon. Admiral John Byng*, Chas. Fearne. London, 1757, p. 106.

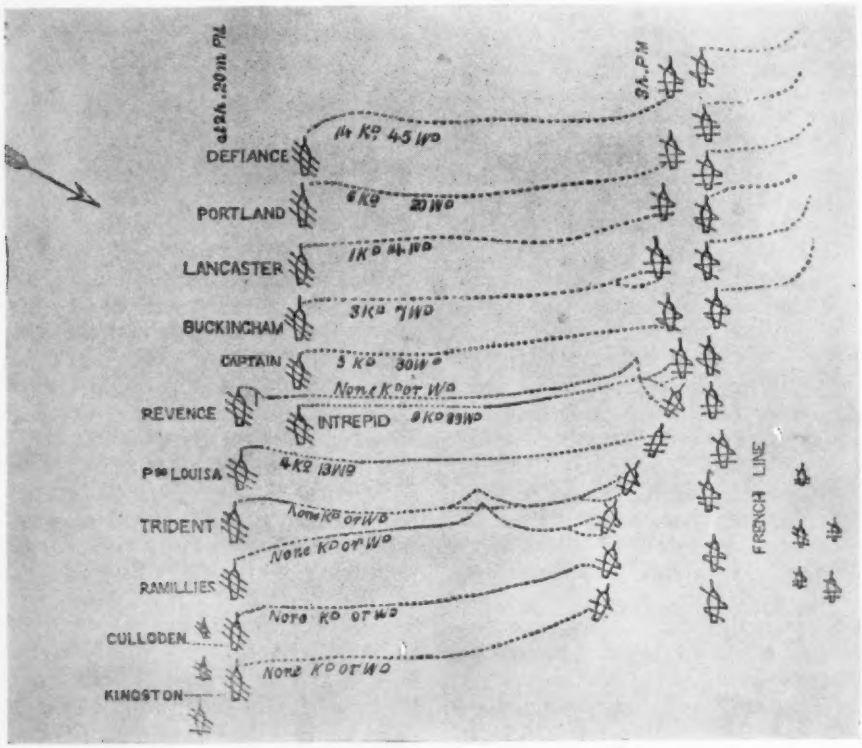
[7] *Ibid*, p. 106.

[8] For this and the preceding quotation, *Ibid*, p. 107.

the two lines were a quarter of a mile apart, and the rearmost about a mile and a half. The result of his signal was that the *Defiance* and the other five ships of the van, as well as the *Revenge* or the first ship of the rear division—all of them—bore down almost before the wind towards the respective French ships opposite them. The reason of this almost direct course, instead of a slanting one, was that only thus could these seven ships engage their allotted opposites; for they were actually (owing either to the wind or to the shortening of sail by the French, or to the uneven spacing of the British line) abreast of their respective antagonists when the signal to engage was given, instead of being somewhat behind them, and diagonal to them, as Admiral Byng had intended. He himself remarks that "the whole van appeared to bear down more than the rear division. . . . . At half an hour after two," he says, "the enemy began to fire, all but the two sternmost ships who reserved their fire some little time longer."[9] As a matter of fact, only the two vans, (plus the *Revenge* and her opposite) were now actively engaged.

In the process of making the direct approach by the British van, it had happened that the sixth ship, the *Intrepid,* had been forced to steer for a time with the wind actually on her starboard quarter in order to close with her antagonist, and she had therefore rashly invited a severe raking from the latter, which had been given with great effect. She found herself disabled, as Admiral Byng says, "by the time she could begin to fire, or very soon after."[10] And here, an incident of this battle-scene (a scene that must appear to our eyes as medieval as a sea-fight in a piece of tapestry) should not be omitted, for it is essen-

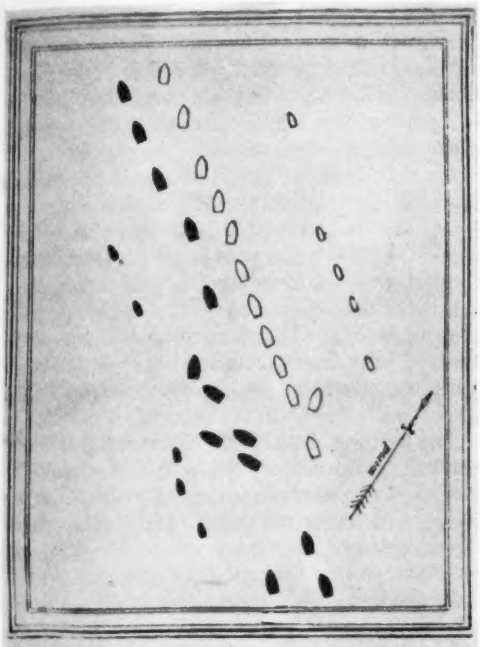
[9] *Ibid,* p. 107.
[10] *Ibid,* p. 107.



BYNG'S ACTION, MAY 20, 1756

(From *Battles of the British Navy,* by Joseph Allen. London, 1852, p. 174).

This diagram is defective in not showing clearly that the disabling of the sixth ship, the *Intrepid,* of the British van, caused the "stopping and doubling of the rear of the line." Also, the rear ships should be more strung out at 3:00 P.M., showing the last three still beyond the French rear.



BYNG'S ACTION, MAY 20TH, 1756.

III.—3 P.M.

(By permission of Sampson Low, Marston & Co., from *The Royal Navy* by W. Laird Clowes; London, 1898. Vol. III, p. 150).

The above diagram shows how at 3:00 P.M. the *Revenge, Louisa, Trident* and *Ramillies* were all out of line and pointing away from the enemy, the *Ramillies* being to windward of the *Louisa* and *Trident*.

tially of the period, and it will make the modern tactician, as it were, rub his eyes and look again. At two forty-three o'clock, as recorded by Admiral Byng, he ordered a signal to be made to the ship *Deptford*, the sixth of the rear division, to "quit the line"; because, if she remained a part of the fleet, the British line would then number thirteen ships to the enemy's line of only twelve. The extra ship, the thirteenth, would disturb the preordained order of battle, with its traditional right of each ship to a duel with its opposite. According to Admiral Byng, the *Deptford* was to be a looker-on until one of his fighting ships should become disabled, and then was to replace her. Surely the force of chivalry (plus absurdity!) could hardly go further than this. With his modified fleet of twelve ships, the condition of the *Intrepid* not yet being realized, Admiral Byng continues his story: "About ten minutes before three, when the enemy's shot passed over the *Ramillies* and through her sails and rigging, and several hulled her, some of the seamen . . . . out of impatience at receiving the enemy's fire without it, began to fire without orders. . . . . I was displeased at firing so soon contrary to my intention . . . . but being then within about half a mile of the enemy with a fine breeze [the wind had freshened], ... I permitted the fire to continue."[11] As a result of this premature firing, his ship was soon enveloped in a thick smoke, and he was thereby prevented for a time from making the disturbing discovery that there was looming up on his lee bow one of his own ships—the *Trident*. This unexpected news was reported to him, and roused him to quick action lest he might "fire into her." "I immediately gave orders [he writes] not to fire without seeing the enemy's colors, and to haul up the fore sail; and finding one ship upon the lee bow and another [the *Louisa*] right ahead, both so close to us with one or both top sails aback, I was under a necessity without hesitation of luffing the ship up so as to back the top sails and avoid being immediately on board of them."[12] He then also gave orders that the whole rear should lie to.

We are now in the thick of the trouble; our finger is on the sore spot of the whole of Byng's engagement. Going back a few minutes we see that it is the disablement of the *Intrepid* which has been the cause of the present situation, namely, that the *Revenge, Princess Louisa, Trident* and *Ramillies*—that is, the seventh, eighth, ninth and tenth ships—should all be brought to, and in the wind, for fear of falling foul of one another. Or, to state it more correctly, it is the way in which Admiral Byng endeavored to extricate these ships from their confusion which has caused them all to lose their speed and to lie to. The controlling feature of his handling of the emergency has been (1) his own cautious avoidance of going to leeward of the arrested ships with the *Ramillies*, (thereby pointing away from the enemy); and (2) his hoisting of a signal to the rest of the rear to observe the same caution. He was determined not to allow any single ship of the rear to turn towards the enemy until all of them together could do so, and moreover could do

[11] *Ibid*, p. 107.
[12] *Ibid*, p. 107.

so in a line of battle. To get them back into this line was his only aim, and when later he had achieved this aim, it was then too late to attack. The time was lost. La Galissoniere had sailed off with his ships—his van alone having been engaged with the British van, and his rear having also given several broadsides to the British van as it caught up with it and passed it. He had badly crippled the British van, but he was only obeying orders in not fighting the whole fleet to a finish for it was the French government's policy of that time to run no unnecessary risks, and to maintain above everything *"la conservation des forces de terre et de mer."*[13] Byng's ships even after being threshed into line by him did not crowd sail, and therefore did not begin to catch up with the French. The battle had been thrown away.[14]

The next four days were spent by the British fleet in lying to and refitting those ships which had been damaged in action, meanwhile keeping an anxious lookout for the return of La Galissoniere, who never appeared. Admiral Byng says: "I thought it proper in this situation to call a council of war [on May 24] before I went again to look for the enemy." The result of this council was that it was agreed that there were not sufficient means at hand, either for relieving the garrison at Fort St. Philip, or for conquering the French fleet. Therefore it was decided to be wiser to take measures for the protection of Gibraltar; and to forestall any probable attack on that place by La Galissoniere's fleet, by returning there with the British fleet. Admiral Byng did not know that the French admiral had no intention of attacking him again, for he had already disposed his fleet in blockade in front of the harbor of Port Mahon.

It was June 3 before the post carrying the information of the inconclusive engagement off Minorca reached England. Then it was an account of it written by La Galissoniere on the day after the battle, and, naturally, colored to suit the French, which first came to the astonished eyes of the Admiralty. The substance of this report was that the British fleet, although having the weather gauge, had attacked the French fleet without completely engaging itself [*"sans s'engager"*], and had been so warmly received by the ships of the French king, as not to dare to approach any nearer.[15] A few days later, Admiral Byng's own official report, dated May 25, was received, describing rather briefly the action, favorably to himself, and his decision to withdraw to Gibraltar. It is written with sincerity, and without the slightest indication of any defect on his part in the tactics of the recent engagements. He remarks: "Though we may justly claim the victory, yet we are much inferior to the weight of their ships,"[16] and he urges a reënforcement.

Without any delay after the receipt of La Galissoniere's report, and before the receipt of Byng's account of the action, the British Admiralty was informed by Mr. Fox, Secretary of State, that it was the "King's pleasure" that Admiral Sir Edward Hawke and Rear Admiral Charles Saunders should proceed at the first opportunity to Gibraltar to relieve Admirals Byng and West, both of whom were to be sent home, and Admiral Byng to be placed under arrest to await trial by court-martial. The ministry—now in a state of consternation—concealed the news of the recent engagement from the British public until June 26, when they published Admiral Byng's report, but not before they had first deleted from it certain passages which looked towards an arraignment of themselves for their negligence in the equipment of the Mediterranean fleet. Their fear, lest the anger of the people should be visited upon them, determined them to divert as much of it as they could towards the admiral whom they desired the public to consider an inefficient and cowardly commander who had basely withdrawn his forces from Minorca to Gibraltar. Their scheme was rewarded by instant success. "The populace," says Smollett, "took fire

[13] *Histoire de la Marine Française*, Lapeyrouse-Bonfils. Vol. II, p. 406.

[14] Students of this action must read the accounts of it by Mahon, Clowes and Sir Julian Corbett. The last says frankly that he finds it impossible, from the information available, to "plot the courses of the (British) fleet with certainty." The present author makes no attempt to present anything more than an outline of what took place, as gleaned by him from the testimony of the court-martial. L.H.

[15] ". . . . l'escadre du roi les a recus de facon a leur faire craindre de trop s'exposer en l'approchant davantage." Quoted by St. Maurice in article on Byng in *Memoires de la Soc. Roy. du Canada.* Tome XI, p. 73.

[16] *Trial of the Hon. Admiral J. Byng,* Charles Fearne. London, 1757, p. 8.

like a train of the most hasty combustibles and broke out into such a clamor of rage and indignation against the devoted admiral as could not have been exceeded if he had lost the whole navy of England. . . . . This animosity was carefully fomented and maintained by emissaries. . . . . They expatiated upon the insolence, the folly, the cowardice and misconduct of the unhappy admiral."[17] There were some, however, who divided equally their indignation between Byng and the government which had not properly equipped his expedition. Admiral Byng himself could not understand the rage which flamed everywhere against him, believed in himself, and trusted to the coming court-martial to vindicate him. He was kept a prisoner, closely confined in Greenwich hospital, during the summer and autumn, until his trial began on December 27, on board the *St. George*, then in the harbor of Portsmouth. Long before this, on June 28, Port Mahon had surrendered and passed into the hands of the French. Hence there had been no abatement in the popular clamor against Byng when the court of thirteen officers—four admirals and nine captains—met to try him on the following charges: ". . . . for that the said John Byng, having command of his Majesty's fleet in the Mediterranean, during the engagement between his Majesty's said fleet and the fleet of the French king on the twentieth of May last did withdraw or keep back, and did not do his utmost to take, seize and destroy the ships of the French king . . . . and for that he, the said John Byng, did not do his utmost to relieve St. Philip's Castle in his Majesty's island of Minorca."[17] He was also charged with having delayed unnecessarily in reaching Minorca.

Four days before the court met the admiral had arrived in Portsmouth, coming from Greenwich in a coach and six, guarded by a party of fifty horse. He had been driven to a boatswain's quarters in the dockyard where a marine guard was posted over him day and night. This excessive caution was wholly unnecessary, but was intended by the government to create a popular suspicion that the admiral would effect an escape if he could. The trial was public, and attracted a large crowd to the *St. George* every day. For over three weeks the court heard testimony —the high-ranking, pompous and be-wigged prisoner taking part himself in putting questions from time to time to the witnesses. Most of these were captains of the late fleet; and the procession of these old-time British commanders—real sailors of the salt seas, whose language puts a smell of salt and canvas and tar and bilge into the nostrils of the reader as he turns the musty pages of this trial of a hundred and seventy years ago—pass before his eyes and challenge his imagination to re-create the naval atmosphere and naval spirit of those days. Let us listen to Rear Admiral Temple West, Esq., (now Vice-Admiral of the Blue) and see what he had to say on the third day of the trial. One of the questions put to him was this:

"Did it appear to you that the wind and weather (on the afternoon of May 20), were such as to have admitted the admiral and his division to have got up with the enemy and engaged them as close as the van did?"

"Answer. 'Yes, it appeared to me so; I saw no impediment. I beg leave to observe that I don't say there was none, but that none appeared to me.' "[19]

These words are only a small part of Admiral West's testimony, most of which was cautiously expressed when he approached any criticism of his late commander-in-chief. Here is something more from him:

"Q. 'Could the admiral and his division have brought the rear of the enemy to an engagement, and by that means have prevented them from making sail up to our van and engaging them?'

"A. 'I know of nothing that prevented their doing so.' "[20]

This is pretty strong language, and the court must have been proportionately impressed. Later in the trial, Captain Young, late commander of the *Intrepid*, the ship which had been disabled, testified as follows:

"Q. 'Did the loss of your fore-top-mast put any ship in danger of being on board you?'

"A. 'No, not as I could perceive at all.'

"Q. 'Did the loss of your fore-top-mast occasion any impediment to the admiral and the rear division from going down and engaging the enemy closely?'

"A. 'Not as I could perceive.' "[21]

Captain Young then stated that the admiral had spent nearly three-quarters of an

[17] *History of England*, T. Smollett, Vol. III, p. 445.

[18] *Trial of Admiral Byng*, Fearne, pp. 3, 4.

[19] *Ibid*, p. 16.

[20] *Ibid*, p. 16.

[21] *Ibid*, p. 60.

hour in backing and lying to before he and the rear had passed to leeward of the *Intrepid,* and slanted toward the enemy. The questions to nearly every witness indicate that the court entertained a doubt as to whether Admiral Byng had at any time during the engagement made enough sail to enable his rear, which was so much farther away from the French line than his van, to reach the French rear. On that point let us read the answers of Captain Parry, commander of the *Kingston,* the rearmost ship of the British fleet:

"Q. 'What sail did you carry when bearing down upon the enemy after the signal (i. e. to engage) was made?'

"A. 'Fore-sail and top-sails, to the best of my remembrance.'

"Q. 'Could you and the rest of our ships have carried all your sails except studding-sails?'

"A. 'Yes.'

"Q. 'Could you, if you had set all those sails from the time the signal was made for battle 'till the French fleet made more sail, have got to close engagement with the enemy?'

"A. 'Yes, if I had set all my sails I could have got to close engagement with the enemy.'"[22]

As an offset to this opinion of Captain Parry's, let us take note of the form in which the following question was put by the prisoner himself, when he examined Captain Gardiner, late commander of the *Ramillies.* (By Admiral Byng):

"Q. 'As the enemy appeared to wait, and not to decline action, do you apprehend it was proper to risk disorder by crouding sail?'

"A. 'A matter of opinion which, as I observed before, lies with the admiral.'"[23]

The student of the trial, as he reads one witness after another, finds himself arriving at the conclusion that it was the reluctance of Admiral Byng to "risk disorder," that is, to approach the enemy in any other way than in that line of battle which was "the naval fetich of the day" (meanwhile pointing away from the enemy until the line could be established), it was this reluctance, or this fear, which was the chief cause of all his troubles and of his being haled before a court-martial.

On January 18, as the trial was nearing an end, Admiral Byng handed in his defense in writing, which was read aloud to the court. I have quoted from it already in describing the actions of his fleet, and I shall now do so again in order to give the reader a glimpse of the inner nature and private feelings of the man himself. Among his opening words are the following:

I would ask, with what view or intention I was sent out on this expedition—if it be answered to protect or relieve Minorca which is the seeming language of my instructions—I would again ask, did those who sent me apprehend that Minorca could be invaded before my arrival, and the descent covered by a superior squadron, when they sent me out with so inadequate a force—if they did, their conduct, is unjustifiable,—if they did not, their ignorance is inexcusable.[24]

And here are the last words of the written defense:

Justice to myself demands, and I hope will be thought a sufficient apology, for that freedom and plainness becoming a man in my circumstances. It is far from my purpose to endeavor fixing any blame or imputation even on my greatest enemies without reason. But the indignation and resentment of an incensed nation, is a load much too heavy for me to bear, though it has been my misfortune to struggle under it so long. And I must entreat the court to forgive my taking up some part of their time, in proving what may at first seem unnecessary by the nature of my charge. That I may vindicate my conduct to an incensed and deluded nation, taught hitherto to look upon me as a principal cause of the public misfortunes, and as a man guilty of the most odious of all military, and most contemptible of all civil crimes. No symptom of cowardice, that odious and capital part of my charge has hitherto appeared to the court. And my innocence and conscious discharge of my duty makes me confident that none will appear. Yet have I already suffered the severest penalties that can be inflicted on it, being hung up in effigy, traduced by libels, tortured by misrepresentations and calumny, disgraced and superseded, upon no better authority than the gasconade of the French admiral, arrested and confined beyond the example of former times, treated like a felon with every indignity and my life pursued with the most inveterate malice. But all this I have had fortitude enough to despise and treat with the contempt it deserves, the result of a conscience clear of all crimes.

. . . . . .

I shall not trespass any longer on the patience of the court, having nothing farther to add, besides some observations hereafter on the evidence, if the remaining time will admit of it. But I fear it will require a much longer time than I shall have to do it in, and a much abler hand than mine, to discuss and digest minutes of such a nature and of so great length. Therefore relying on the candour and ability of my judges, as my only and proper council, I must beg that they will be pleased to allow for my defects and omissions, and supply any want of more proper talents to explain and support my innocence.[25]

[22] *Ibid,* p. 99.
[23] *Ibid,* p. 118.
[24] *Ibid,* p. 102. I have preserved the Admiral's own punctuation in this and other quotations from him. L.H.
[25] *Ibid,* p. 112.

After the testimony was all in, and after no less than a week of fierce discussion behind closed doors, the conclusions of the court, as condensed, were to this effect: (1) that Admiral Byng had not made a proper effort to relieve the garrison at Fort St. Philip; (2) that he had not done his utmost to take, seize, and destroy the ships of the enemy, the French king. The court therefore found him guilty under the twelfth article of war, which prescribed, without alternative, that any person who had not done his utmost against the enemy's ships must suffer the penalty of death. But the court completed its sentence with the following words: "the Court do not believe that his misconduct arose either from cowardice or disaffection, and do unanimously think it their duty most earnestly to recommend him as a proper object of mercy." Here it is pertinent to observe in parenthesis that Admiral Byng, when called aboard the *St. George* to hear the decision of the court, and when privately informed beforehand what that decision was going to be, was astounded to learn that he had been adjudged guilty of any worse offense than a mere error of judgment. It is to his credit that he then exclaimed to his informant: "Well, if my death will appease the clamors of the people, in God's name let them have it."[26]

It should be remarked that Admiral Byng's court, by absolving him of both "cowardice" and "disaffection," by implication found him guilty of "negligence." The reason that the excessive penalty of death was in those times exacted for this offense was that in the recent past there had been a tendency for British naval courts to punish junior officers for minor offenses with brutal severity, while permitting high ranking officers to escape the full consequence of their deficiencies and misconduct. Hence there had been an act of Parliament, three years before, which obliterated from the twelfth article of war, after the word "death," the following words: "or such other punishment as the circumstances of the offence shall deserve and the court-martial shall judge fit."[27] As matters stood, the execution of the sentence of death against Byng could not be altered one iota unless the King himself showed mercy. Nothing of that nature becoming apparent, a warrant was issued to the commanding officer at Portsmouth to carry out the sentence on February 28 "by causing him, the said John Byng, to be shot to death by a platoon of marines on board such one of his majesty's ships in Portsmouth Harbour as you shall think proper."[28]

A respite of two weeks was the only favor shown the condemned by the king, which postponed the date of his execution to March 14. Before reaching this event, no story of Byng's downfall can be complete without an attempt to describe the passion aroused by the publication of his sentence among all classes of the British people. There are today hundreds of contemporary papers and pamphlets in the British Museum, written in the most violent and abusive language on both sides of the question. To a few, Byng was a saint, immolated to save the character of a despicable ministry; to the majority he appeared a coward and a renegade. One of these tracts calls him a "Son unworthy of his father, a native unworthy of his country, and an officer unworthy of his command." Another tract, after denouncing the ministry, concludes that only fools and madmen will hereafter accept an admiral's commission "on the ignominious terms of serving with a halter about their necks that a knot of domineering grandees may be exempt not only from punishment but imputation." To get a true picture of the disturbance of the nation it is indispensable to read Horace Walpole's fifty-odd pages of discussion of this case, including the daily debates in Parliament, the incapacity of the ministry, the championship of Byng by Pitt, the heartfelt appeals of the naval officers who had composed Byng's court to be allowed to reveal the reasons for their harsh vote and how they now prayed for mercy for their brother-officer—all these things are told by Walpole with feeling, and also with leniency towards the condemned admiral.[29]

In France his cause had been espoused by some important people. Voltaire, whose name is for all time associated with that of Byng, wrote this letter to him in January, 1857, enclosing a letter to himself from the

[26] *Admiral Byng's Defence.* London and Boston; 1757, p. 44.

[27] *The Royal Navy,* W. Laird Clowes, Vol. III, p. 157, note.

[28] *Trial of the Hon. Admiral J. Byng,* Chas. Fearne, London, p. 130.

[29] *Memoirs of the Reign of George II,* Horace Walpole, Vol. II, pp. 212 *et seq.*

Duke of Richelieu, then in command of the French forces in Minorca:

> Sir: Though I am almost unknown to you, I think it is my duty to send you the copy of the letter which I have just received from the Marshal Duke of Richelieu: honour, humanity and equity order me to convey it into your hands. This noble and unexpected testimony from one of the most candid as well as the most generous of my countrymen, makes me presume your judges will do you the same justice.

The letter to Voltaire from the Duke of Richelieu contains the following expression:

> "When two commanders contend for victory, though both are equally men of honour, yet one must necessarily be worsted, and there is nothing against Mr. Byng but his being worsted; for his whole conduct was that of an able seaman, and is justly worthy of admiration."[20]

To be indorsed by France was, of course, less than a help to Admiral Byng. The English people even lampooned the king, fearing his clemency, and declared in posters that Byng must hang. But George II appears not to have dared to show any mercy to the prisoner, or else he did not wish to. The day set for the execution was not to be stayed, either by Byng or by fate. Two days before it, the admiral wrote a deeply earnest letter to William Pitt in which he says: "I am now on the very brink of Eternity, I am summoned by my temporal judges to appear on Monday next before a more discerning tribunal, but I forgive my enemies, as I desire forgiveness from the Almighty." After arguing, with great sincerity and with some skill (but not, it should be added, with a force that convinces), that his only crime had been an error in judgment, he asks:

> But who can be presumptuously sure of his own judgment? If my crime is an error in judgment and differing in opinion from my judges, yet, if the error in judgment should happen to be on their sides! The Lord forgive them as I do. . . . . I could willingly proceed, sir, but you know my time is very short, and that I ought to make much of every moment, therefore, the blessing of a dying man attend you, and farewell forever![21]

The forenoon of March 14 at Portsmouth and Spithead was stormy and windy, with ships of war and of commerce tugging at their anchors. Our concern is with the quarter-deck of only one of them, the seventy-four-gun ship of the line, *Monarch*, anchored in the inner harbor, aboard which Admiral Byng had been confined since his trial on the *St. George*. Of the moving scene about to take place aboard of her there can be no account so accurate as that of an eye-witness, and I therefore quote the following:

> Extract of a letter from Portsmouth, March 15, 1757. "Orders being given for all the men-of-war at Spithead, to send their boats on Monday morning, the fourteenth of March, with the captain, and all the officers of each ship, accompanied by a party of marines in each boat, under arms, to attend the execution of Mr. Byng; they, in pursuance of that order, rowed from Spithead, and made the harbour a little after eleven o'clock, with the utmost difficulty and danger, it blowing a prodigious hard gale, the wind at W.N.W. and ebbing water, it was the more difficult to get up so high as the *Monarque* lay, on board which ship the admiral suffered. Notwithstanding it blew so hard, and the sea ran very high, and with great violence, there was a prodigious number of boats round the ships on the outside of the men-of-wars boats, which kept off all others. Not a soul was suffered to be on board except those belonging to the ship. But those ships that lay any way near her were greatly crouded with spectators, all their shrouds and tops being full, altho' it was then difficult to see any thing on board the *Monarque*. Mr. Byng walked out of the great cabin to the quarter-deck, where he suffered on the larboard side, a few minutes before twelve o'clock accompanied by a clergyman, who attended him during his confinement, and two gentlemen his relations. He was dressed in a light grey coat, white waistcoat, and white stockings, and a large white wig, and had in each hand a white handkerchief. He threw his hat on the deck, kneeled on it, tied one handkerchief over his eyes, and dropped the other as a signal, on which a volley from six marines was fired, five of whose bullets went through him, and he was, in an instant no more. He insisted on not having any thing before his face, but was greatly pressed to it, being persuaded it was not otherwise decent, and that the marines might be intimidated from taking proper aim. His coming out of the cabin, which I particularly observed, from the stillness and attention of all on board, could not be two minutes to his death. In short, he died with great resolution and composure, without the least sign of timidity, and the moment the muskets went off, there was a blue pendant thrown out at the fore-topmast-head, which continued flying about five minutes, and was then struck; on which all the men-of-wars boats went off to repair on board their respective ships."[a]

A trivial item, but one that may serve to indicate the habits of the times, or else the habits of Byng, should not be passed by here. The admiral, with the kindly thought of a master who is about to exact disagreeable services of his servants, gave orders that a distribution of ten guineas should be made among the marines who were about

[20] Both these letters are from the *Trial of Vice Admiral Byng*, London and Boston, 1757, p. 28.

[21] From "An Exact Copy of a Remarkable Letter from Admiral Byng etc." London, n.d., p. 15.

[a] See Plate XXXII.

to shoot him.[32] This little act seems the fine flower of fine manners; it has the Grandisonian touch.

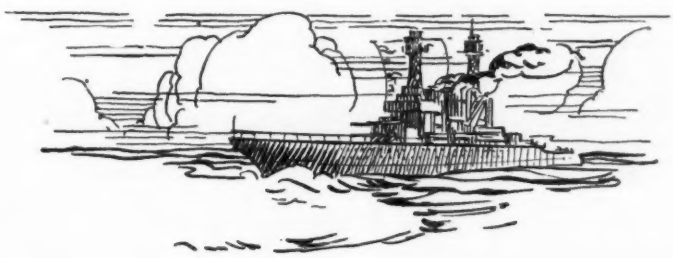
After reading of the manner of his death, one feels that whatever his failings, Admiral Byng died like a hero and a gentleman. But the cutting short of his life on the quarter-deck of the *Monarch* was only a second tragedy in his existence; and to those who most wish his memory well, both as officer and man, his execution must appear a lesser misfortune than the one which he wrought upon himself on the afternoon of May 20, 1756. The killing of his fame as a competent and daring naval officer was effected by himself in the three-quarters of an hour when he failed to rise to the occasion. In truth, there was nothing great about Byng. To weigh the causes which led to his premature death, there seem to be three which ought to be considered: (1) the vengeance of an uninformed and frightened Admiralty; (2) the absurd battle tactics of the time; (3) the lack of strong character and of professional efficiency in Byng. The impartial judgment of posterity must exclaim over the savage severity of his sentence, which took away his life when it should only have taken away his commission. "He was neither traitor nor coward," says Clowes, and "his chief fault was that he was not independent enough . . . . to dash in when occasion allowed him."[33]

After the curtain of this drama fell, epilogue came upon the stage in the person of the sardonic Voltaire, whose immortal comment on the British government and people in regard to Byng appears in his story of *Candide,* and invites his audience to join him in a grin at one more scene of human folly. Candide and his friends are depicted as arriving in Portsmouth harbor on a passenger ship just as the execution of Byng is taking place. "What is all this about," said Candide," "and what devil is at work here as elsewhere?" He asked who the important man was who had just been killed with ceremony. "That is an admiral," was the answer. "And why kill this admiral?" "It is because he himself has not done enough killing; he has had an engagement with a French admiral and it has been decided that he did not get near enough to the French admiral." "But," said Candide, "was not the French admiral as far away from the English admiral as the latter from the former?" "That is incontestable," was the reply, "but in this country it is a good thing to kill an admiral from time to time, *pour encourager les autres.*"[34]

[32] Beatson's *Naval and Military Memoirs,* London, 1804, Vol. III, p. 144.

[33] *The Royal Navy,* Vol. III, p. 160.

[34] *Candide, ou l'optimisme,* Voltaire, Chap. XXIII. The translation is mine. L.H.



Notes *on* Ground Tackle

By COMMANDER A. S. DYSART, *U. S. Navy*

FROM the time the Boston Navy Yard started making chain there was little improvement in the material used until about 1916, when mild steel was substituted for wrought iron as a stronger and cheaper material. About 1921 the use of cast steel chain was begun.

It has, due to its carbon and manganese content and heat treatment, more strength than a mild steel chain and appears to be giving excellent service.

One of the results of the adoption of cast steel chain was the removal of chain making from the Boston Yard, as this yard is not equipped with a furnace suitable to the manufacture of cast steel chain. The Navy Yard, Norfolk, now makes excellent cast steel chain and some is purchased on the outside. The Boston Navy Yard continues to make chain appendages and to repair chain.

The detachable link, invented by Mr. James Reid, Master Shipsmith, and Albert Leahy, Leadingman Shipsmith, is one of the appendages made at this yard. Due to its similarity to an ordinary link it rides the wildcat well and is rapidly replacing the old "U" connecting shackle. For the benefit of those readers not yet familiar with it, it is shown in Figures 1 and 2.[1] Figure 1 shows the link assembled. In Figure 2 the link is partly disassembled to show its construction. The "C" link is kept from opening up when in tension by two locking plates which fit over collars on the ends of the link. The locking plates are held together by a taper pin which passes through internally projecting lugs on the locking plates. This taper pin, after being driven home, is keyed in place by a lead keying ring, in the same manner as the forelock pin on the U-shackle. In the most recent design the pin is held in by a lead plug upset in a dovetail recess over the large end of the pin.

[1] See Plate XXXIII.

The invariably high strength of the detachable link and its simplicity have recommended it to the U. S. Army, for which the yard recently filled an order for 435 feet of three-inch chain. This chain is to be used to replace the original three-inch wrought iron fender chain which forms an emergency stop for ships traversing the Panama Canal locks. It is made up of alternate solid and detachable links as shown in Figure 3. In this case the locking plates are riveted together instead of being held by a taper pin. The minimum breaking load of this chain was 800,000 pounds compared with 500,000 pounds for three-inch wrought iron chain which it replaces.

The success of the detachable link led its designers to apply the principle of the mechanical lock to the closure of an ordinary chain link. Nickel steel is very difficult to weld, otherwise it would probably have been employed much sooner in chain forging. The mechanical lock provides a practical substitute for the weld.

In making links of this type, it was found most practical to make the link in two pieces rather than to try to bend the bar accurately to the link form and have only one lock; consequently the link is made in two pieces, *A* and *B*, as shown in Figure 4.

Piece *A* is a drop forging, of .30 per cent carbon, 3½ per cent nickel steel, and is heat treated to give it a tensile strength of 150,000 pounds per square inch and an elongation of about eighteen per cent. This is substantially the material of which automobile axles are made.

The three collars on the taper ends of *A* have a calculated shearing strength somewhat in excess of the tensile strength of the shank up to the first collar. This shank is made long enough so it will bend rather than break under heavy transverse load.

Part *B* of the link is a drop forging, with stepped sockets to receive the ends of *A*. In Figure 4*B* one socket is sectioned to show

its shape. These pieces are forged without sockets and annealed after forging in order to facilitate drilling. On the one-inch size, the only size so far made, these sockets are drilled in four links at a time on a multiple spindle drill. A rather high degree of accuracy is necessary to make the steps of the sockets concentric with the link and with each other. So it was found necessary to do the job in two operations. The large holes are drilled with twist drills in the first operation, Figure 5. The links are then cleaned of their chips and the holes finished in the same jig by a flat stepped drill. About ninety-six links an hour were drilled by one man in the first operation, the jig being loaded and unloaded while the holes were being drilled, then rotated 180 degrees to drill the four last links loaded. The finishing of the holes was done by a machinist and helper at the rate of 120 an hour. After drilling the sockets the half links are ready for assembly. The *B* half is heated in a lead bath to a temperature of 1,750°F., a bright red heat, the *A* half quickly inserted, and the *B* half permanently closed around the ends of the *A* half in drop forging dies the shape of the completed link. The dies are mounted in a 1,500 pound drop forging hammer. Only one blow is struck. There is a slight excess of metal which appears as a flash in the way of the lock. This flash is important as it is an indication of the hydraulic pressure set up in the plastic metal while being squeezed in around the collars. If the flash is slight in amount or not all around the location of the lock, the link is cut out with an acetylene torch as it indicates a poor lock. Only half a dozen out of almost 4,000 links were imperfect, however.

After the assembling hammer blow, the chain is quickly removed and the hot end of the link quenched for five seconds in cold running water. In quenching, the link is dropped through a slot in a steel plate just over a small tank of water which is continually overflowing. The next link catches on the sides of the slot and keeps the link being quenched from being immersed beyond the stud, as it is not desired to harden the thin shell section above the collars. This might lead to cracking.

The operator times the quench by the flash of an electric light connected to an automatic timing switch. He immerses and removes the link on the flash of the light, so the quench is accurately timed.

In addition to being well squeezed in around the collars, the sides of the socket shrink still further on cooling, producing a joint which is tight enough to ring like solid metal.

After quenching, the flash on the inside of the *B*-end of the assembled link is removed with a punch, a new *A* half rove through the *B* end of the last link made and another link assembled. Two men can assemble as high as 500 one-inch links in an eight hour day.

In order to insure ductility in all parts of the link the whole chain was drawn back in an annealing furnace to a temperature of 850° F. After the draw-back, each shot of chain was proofed to a load of 90,000 pounds, and a triplet representing this shot pulled to destruction.

All shots stood the proof load without parting, but one link on the fourteenth shot appeared to have pulled out about one-eighth-inch on proof test. This link was twenty-fifth from the end of the shot, so it was cut out and twenty-five new links added to the shot, which was re-proofed without further failure. Owing to a shortage of nickel steel of the right size, the fourteenth shot had been made of miscellaneous sizes of nickel steel, varying somewhat in carbon content, and not responding uniformly to heat treatment. Consequently a soft link got in.

After proofing, the external flash was ground off and each shot tumbled in a tumbling barrel to remove forging scale, and painted by drawing through a vat of hot asphaltum paint.

These two cables of one-inch die lock chain have been assigned to mine sweepers for a service test and further information must await the result of that test.

The manufacture of 2½-inch and ¾-inch die-locked chain for further service test has been authorized and work is progressing on the dies.

The writer has lost no chance to "boost" this chain to brother officers on ships visiting the Boston Yard. They have been much interested in its development, particularly in its reliability.

There appears to be a difference of opinion as to how much of an advantage an increase in strength will be. The writer believes that the increase in strength will

A
VERTICAL DISTANCE FROM HAWSE PIPE TO WATER'S EDGE. (FEET)
B
LENGTH OF CHAIN FROM HAWSE PIPE TO SURFACE OF WATER. (FEET)
C
SPAN OF CATENARY ORDINATE AT HAWSE PIPE
D
LENGTH OF SPAN OF CATENARY (FATHOMS)
E
VERTICAL DISTANCE FROM HAWSE PIPE TO BOTTOM OF CATENARY (FATHOMS)
B/A
WATER LINE
SEA BOTTOM
FIG. 6 a
FIG. 6

enable us to reduce the size of chain carried by a vessel, and to supply the weight saved to more useful purposes. Opinions vary as to how far we should go in this direction. The writer believes that the forty-five fathoms of chain next the anchor should be heavy, so as to allow ships to moor safely in restricted harbors where the holding ground is good. The size of the anchor might even be somewhat increased. But it is believed the rest of the chain cable should be as light as is consistent with strength, and should therefore be made of links whose external dimensions adapt them to the wildcat, but whose wire diameter is smaller.

Saving of weight in chain opens up the possibility of using corrosion resisting materials in its manufacture, where heretofore the cost has been prohibitive. It is believed that by careful design, die-locked chain can be made equal in proof strength to the proof strength required of cast steel chain as made at present, *but weighing only about half as much.* This does not mean that the steel used would have twice the ultimate tensile strength of good cast steel, but that, being a forged product without unseen internal defects to which cast steel is prone, it may be proofed to twice the load now used in proofing cast steel chain. Sample links made and broken at this yard indicate that this is possible with nickel steel, and chrome iron, a stainless alloy which has about the same strength. No chain has so far been made of the latter alloy—only single links—but it is hoped that we will have some data on it soon. At present it is only a possibility, inviting thorough investigation.

In investigating the holding power of ground tackle, the writer has been unable to find much exact information on just what makes an anchor hold. The following conditions, however, are submitted as essential to safe anchorage:

1. The anchor should have at least the flukes buried.
2. There should never be an upward pull on the anchor.
3. The more chain lying on the bottom the better, but forty-five fathoms lying permanently on bottom in good holding ground will hold against very heavy wind and sea.

The last statement is hazarded from the writer's own observations, and recent calculations on the span of the catenary. A riding chain may be considered to be made up of two parts; that lying on the bottom, and the catenary from the bottom to the hawse pipe. Except for its action as a spring to absorb shocks, the catenary of an anchor chain does not help the anchor to hold, but merely connects the ship to the anchor. On the other hand, that portion of the chain lying on the bottom tends to bury itself in the mud, keeps the shank of the anchor down, and even if lying on a hard bottom, helps to hold by friction.

We are, therefore, interested in knowing how much chain is on the bottom, and the alignment chart, Figure 6, gives us a ready means of finding out, with practically no calculation.

Figure 6a represents a ship at anchor. In this figure, A is the vertical distance from the hawse pipe to the water line; B the distance from hawse pipe to waterline along the chain; D the length of the catenary; E is the height of the hawse pipe above the bottom of the catenary.

Now, if we know the inclination of the tangent to a regular curve, the equation to the curve, and the ordinate at the point of tangency, we may construct the curve. The ratio B/A is to all intents and purposes, the cosecant of the angle which the curve at the hawse pipe makes with the horizontal. Now, as the catenary is a regular curve, and as we know the ordinate at the hawse pipe, we may if we wish, and are good mathematicians, construct the catenary, knowing one ordinate and the angle of the tangent at that point. But not being a good mathematician, I preferred to construct a catenary on a large scale, and from the curve itself to pick out for a large number of points on the curve the relation between the length of the span, the inclination of the tangent and length of ordinate at these points. When the chain makes an angle of forty-five degrees or less with the surface of the water this relation may be roughly expressed by the formula: Length of span, $D = 1.8\ BE/A$, but of course the formula becomes $D = E$ when the chain is up and down. In constructing the alignment chart this relation was computed for fifty or more points on the curve. It is, therefore, more accurate and easier to use this alignment chart as follows:

Assume the following problem: A ship

FIG. 6

is at anchor in 17½ fathoms of water, riding to 90 fathoms of chain. The hawse pipe is fifteen feet above the water. Twenty-four links 2⅞-inch anchor chain are in sight between the hawse pipe and the water. The inside of the one link is 11½ inches. How much chain is lying on the bottom, assuming it horizontal?

The vertical distance in feet from the hawse pipe to the water is fifteen feet. This is *A*. We have counted the number of chain links between the hawse pipe and the water. To be on the safe side we have taken the maximum number of links (as a wave trough passed). If the ship is surging on the cable, count the links when the chain is tautest. From measurement of the inside length of one link, 11½ inches, multiplied by the number of links in sight, 24, we get *B*. This is $(24 \times 11.5)/12$ or 23 feet. A straight edge through *A* and *B* gives us *B/A* in the *B/A* column, in this case 1.53. From this value of *B/A* follow a diagonal straight line to the same value in the *C* column, (*c*).

The distance from the hawse pipe to the horizontal sea bottom is 17½ fathoms + 2½ fathoms or 20 fathoms. Laying a straight edge between (*c*) and 20 fathoms in column *E* it is seen to intersect column *D* at 55 fathoms. Therefore, under the conditions named, the span of the catenary would be 55 fathoms. As 90 fathoms of chain are out 90 — 55 or 35 fathoms are lying on the bottom.

If the sea bottom is not horizontal, the maximum sounding should be used in column *E*. If anchor is in deeper water than the ship, use the sounding at anchoring, otherwise use a sounding at the hawse pipe. Remember to add the distance from the hawse pipe to the water line to the sounding and do not use the sounding alone.

Another thing we would like to know about our anchor chain is the tension on it during heavy weather or in towing. Having found the span of the catenary by the chart, Figure 6, we can determine the tension in pounds along the chain by the formula:

$$T = (W/2E)\ (D^2 + E^2)$$

Where T = tension along the span in pounds.

W = weight per fathom in water (87 per cent of weight in air).

D = length of span in fathoms.

E = vertical distance of hawse pipe above bottom of catenary.

Suppose in the problem already solved the chain weighs 467 pounds per fathom. What is the tension on the chain? In this case:

$W = .87 \times 467$.

$D = 55$.

$E = 20$.

Therefore the tension $(T = .87 \times 467/40)$ $(55^2 + 20^2) = 34{,}900$ pounds.

A pull of 34,900 pounds on a tow line would tow a 10,000-ton scout cruiser somewhere around eight knots so it will be realized that there must be heavy weather to put such a strain on the anchor chain.

Yet the breaking load of 2⅞-inch cast steel chain is 640,000 pounds, about eighteen times the pull on the anchor chain as computed above.

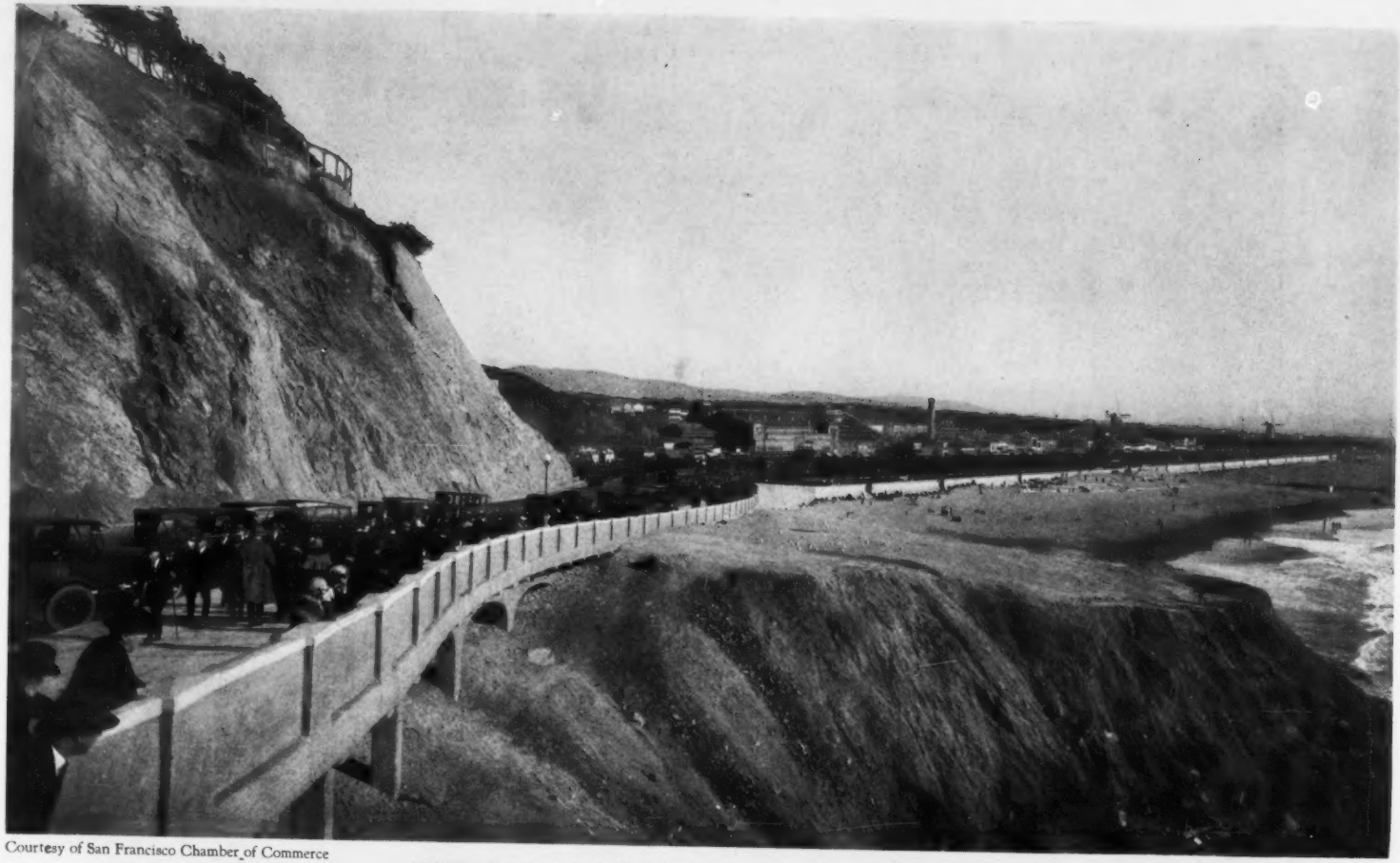
Our anchor chain is of course expected to receive its maximum load when checking the headway of a ship while anchoring. This puts a greater stress on it than any usual riding stress.

Systematic collection of data when our vessels are anchored in rough weather would give us much information on which to base scientific design of ground tackle to give us maximum holding power for minimum weight.

The writer wishes to acknowledge the assistance and criticism of Lieutenant A. G. Merrill (CC), U.S.N., and Messrs. J. Reid, A. Leahy, C. G. Lutts, and J. F. Pyne, whose efforts have made possible the improvements in ground tackle recently made at the Boston Navy Yard, and who have given material assistance in the preparation of this paper.

1. DETACHABLE LINK, ASSEMBLY.
2. " , DISASSEMBLED.
3. 3" FENDER CHAIN FOR PANAMA CANAL LOCKS, SHOWING ASSEMBLY.
4. DIE LOCK LINK, SHOWING CONSTRUCTION.
5. DRILLING SOCKETS IN DIE LOCK LINKS, SHOWING ROTARY JIG, HOLDING LINK HALVES.

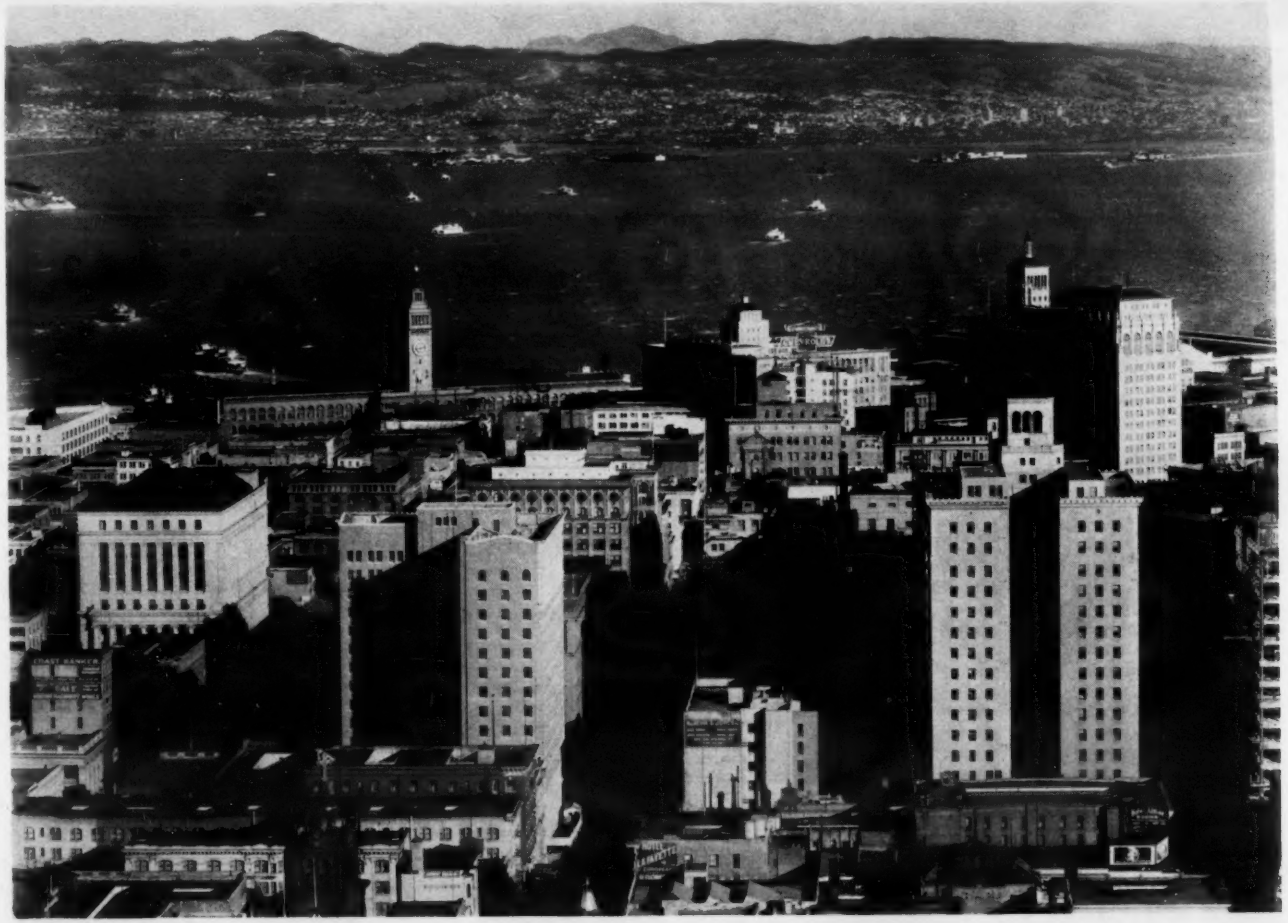
FIGS. 1, 2, 3, 4, 5
See "Notes on Ground Tackle."



Courtesy of San Francisco Chamber of Commerce

BEACH FROM THE GREAT HIGHWAY, SAN FRANCISCO, CALIFORNIA

BEACH FROM THE GREAT HIGHWAY, SAN FRANCISCO, CALIFORNIA



International Newsreel

SAN FRANCISCO LOOKING TOWARDS OAKLAND, CALIFORNIA
Note the Market Street Ferry Building tower in the left center.

International Newsreel

UNION SQUARE, SAN FRANCISCO, CALIFORNIA

Dewey Monument in the foreground. The new Mark Hopkins Hotel in the distance, located on Knob Hill, is the highest point of San Francisco's skyline.

International Newsreel

CORNER OF FINE ARTS BUILDING, SAN FRANCISCO, CALIFORNIA

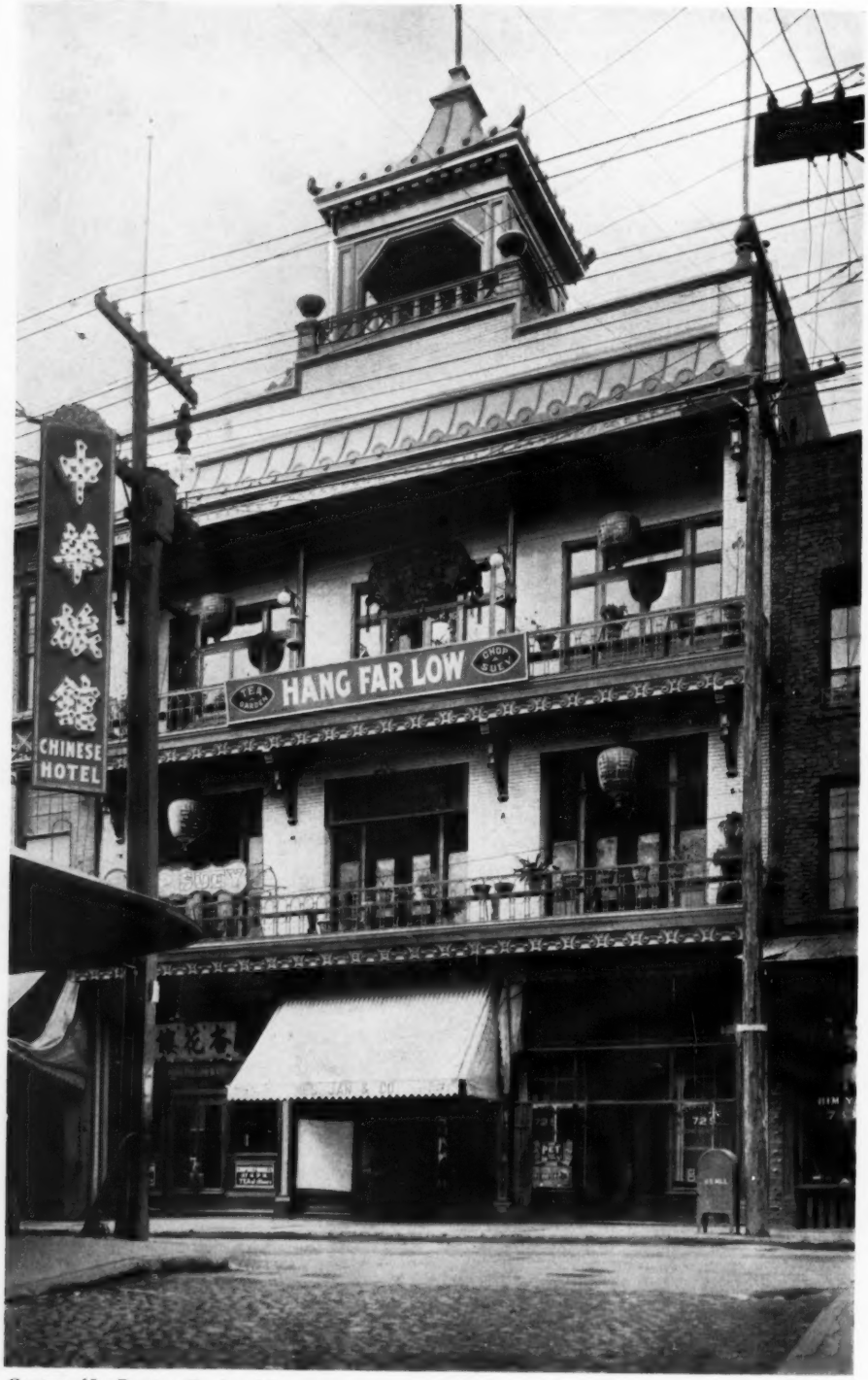
Courtesy of San Francisco Chamber of Commerce

THE FLEET AT ANCHOR AT SAN FRANCISCO
The fleet, illuminated, rivals the aurora borealis.

THE FLEET AT ANCHOR AT SAN FRANCISCO
The fleet, illuminated, rivals the aurora borealis.

Courtesy of San Francisco Chamber of Commerce

WESTWOOD PARK
One of San Francisco's residential districts.



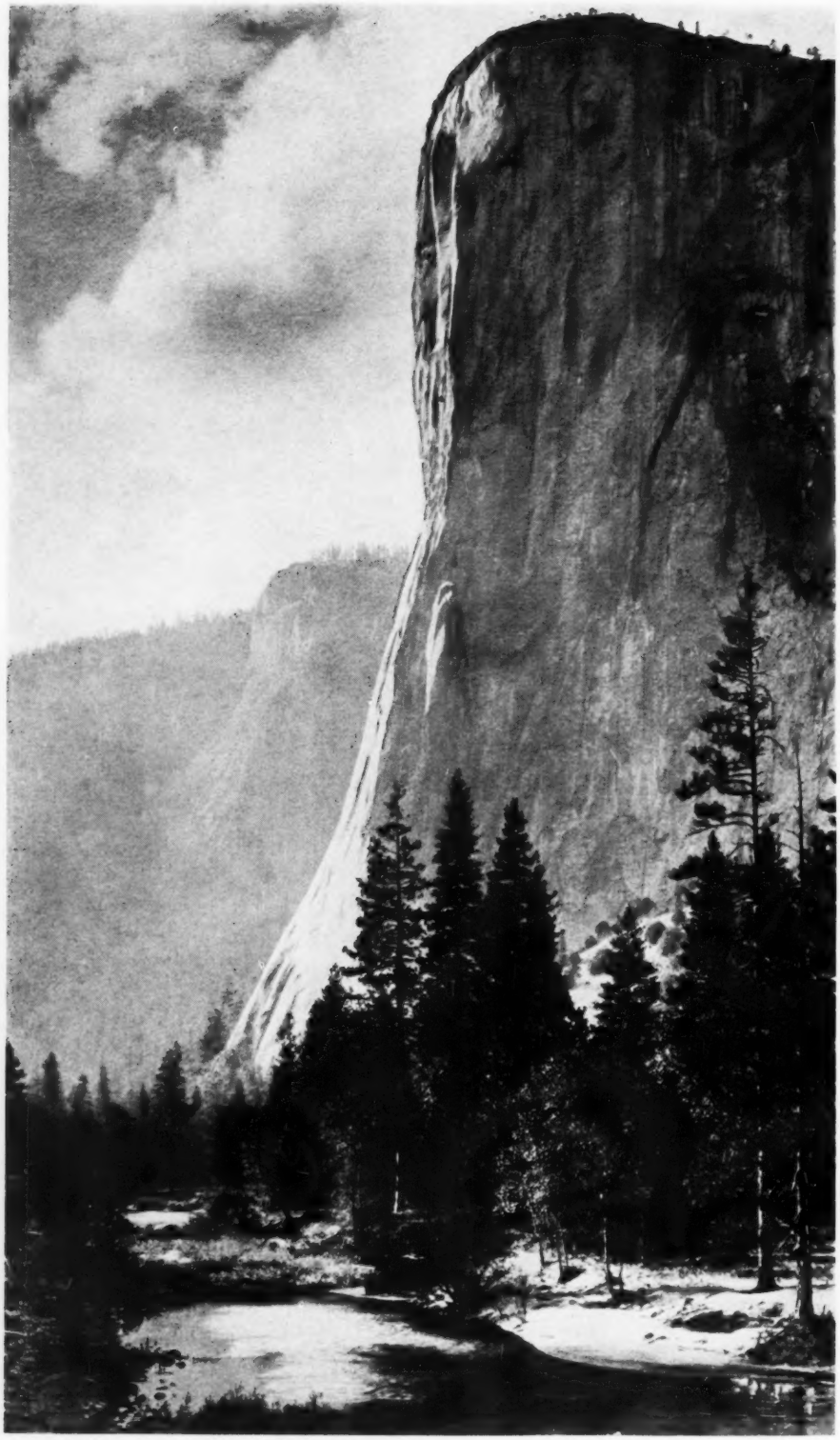
Courtesy of San Francisco Chamber of Commerce

A PART OF SAN FRANCISCO'S CHINATOWN

Courtesy of San Francisco Chamber of Commerce

CAMPANILE

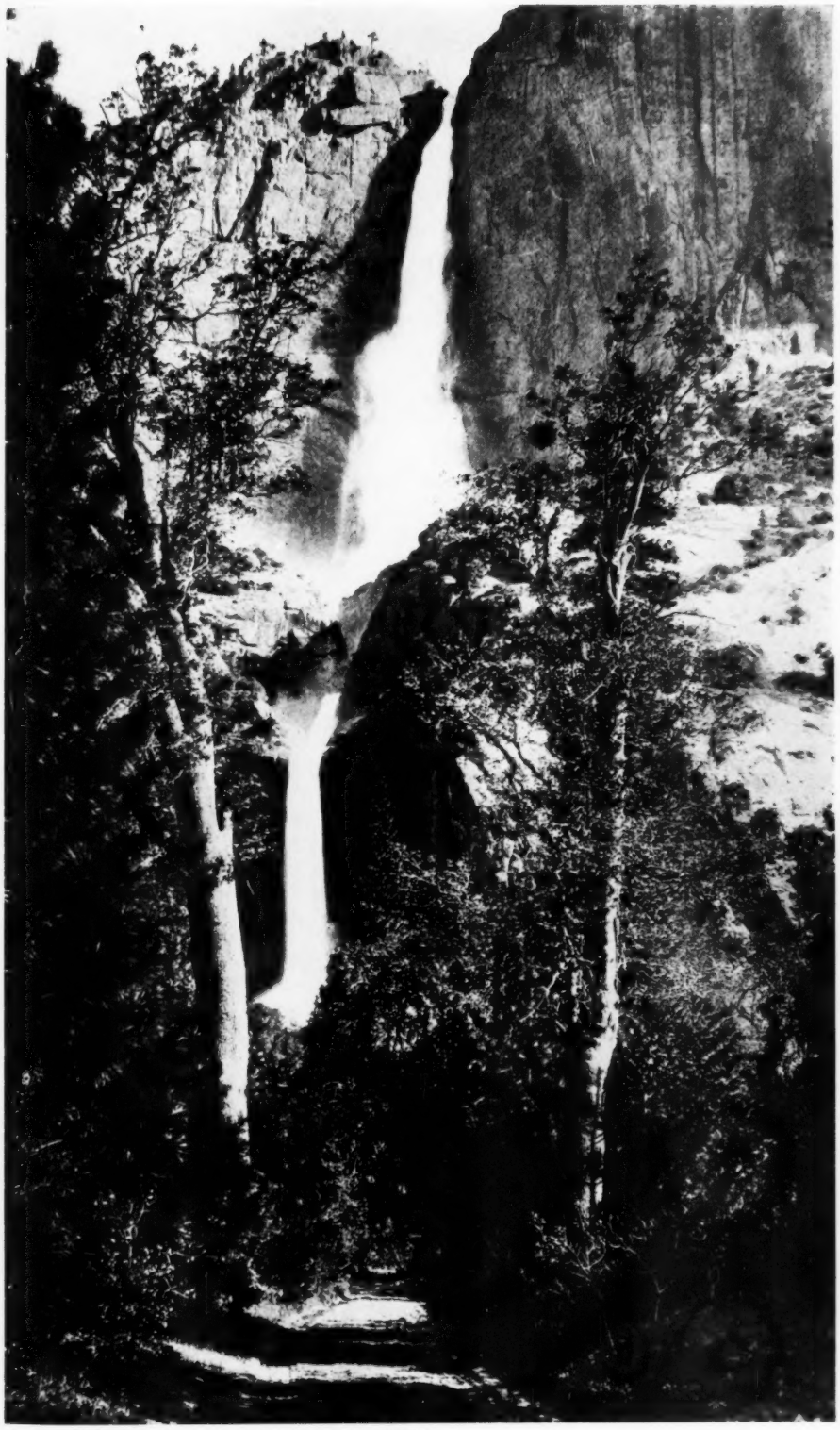
University of California, Berkeley, California. One of the country's greatest universities.



Courtesy of Lieutenant Commander Richard Wainwright, U.S.N.

EL CAPITAN, YOSEMITE VALLEY

Picture taken in 1908. Officers of the fleet had opportunities to visit this beautiful park.



Courtesy of Lieutenant Commander Richard Wainwright, U.S.N.

UPPER AND LOWER YOSEMITE FALLS

Picture taken in 1908, on the fleet cruise.

Courtesy of San Francisco Chamber of Commerce

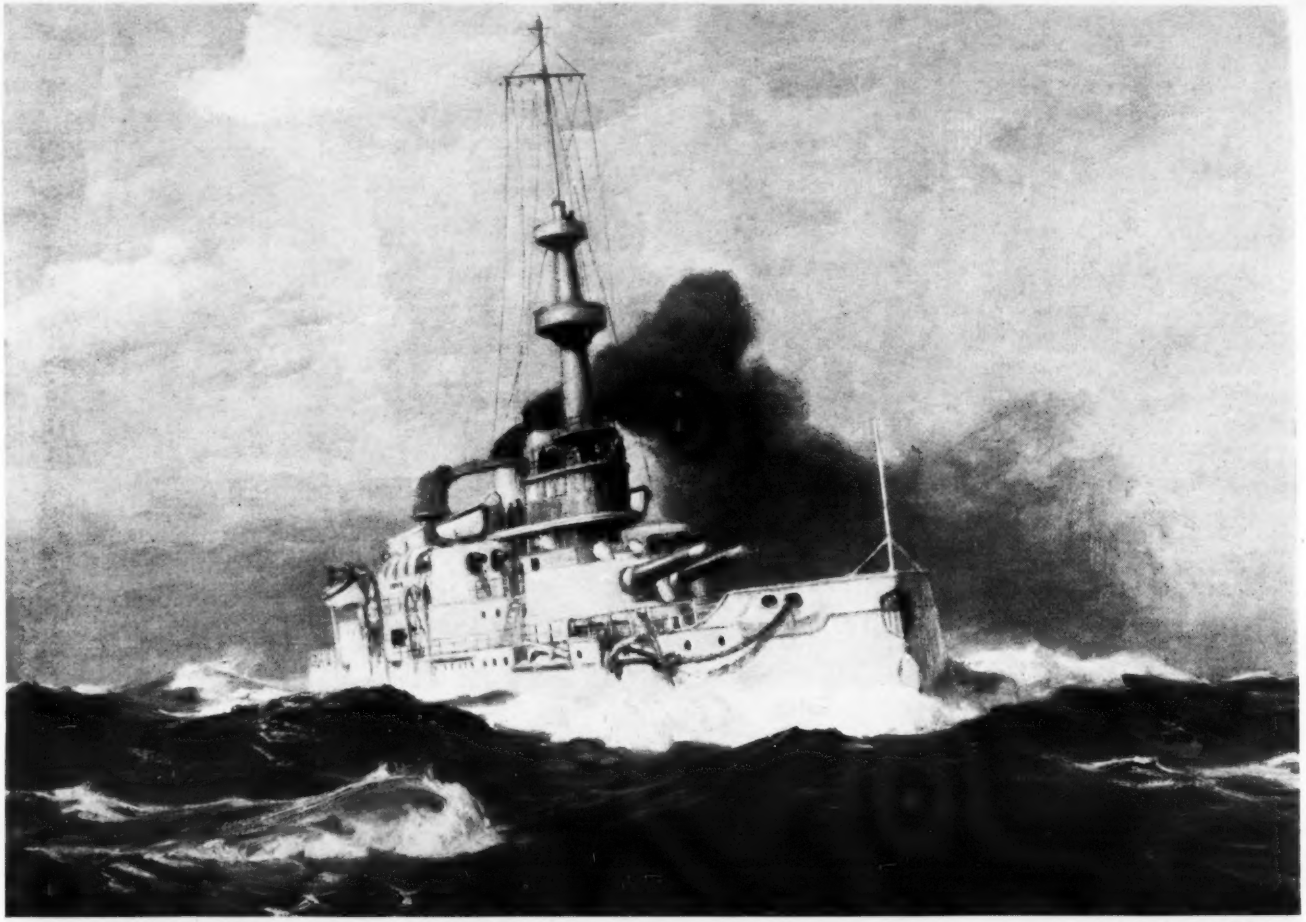
A SCENE AT STANFORD UNIVERSITY

Looking through one of the arches of the main building at Stanford University, Palo Alto, California.
A group of structures of beautiful Spanish architecture.

Courtesy of San Francisco Chamber of Commerce

A SCENE AT STANFORD UNIVERSITY

Looking through one of the arches of the main building at Stanford University, Palo Alto, California. A group of structures of beautiful Spanish architecture.

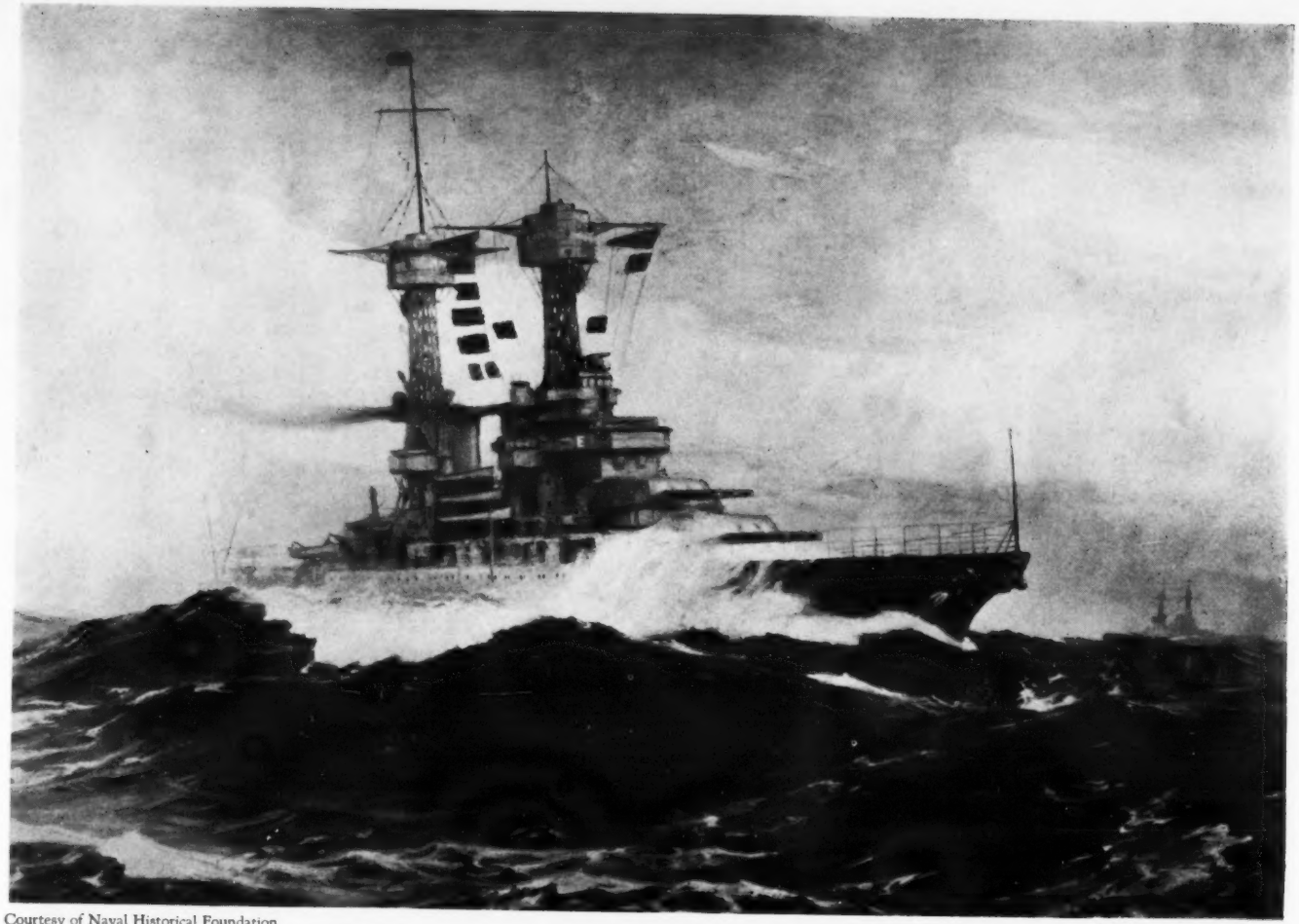


Courtesy of Admiral Charles F. Hughes, U.S.N.

Painting by C. R. Patterson

U.S.S. *OREGON*

Thirty years ago the *Oregon* made her famous voyage from the West Coast to join the fleet off Santiago, Cuba. She arrived in time to join the fight.



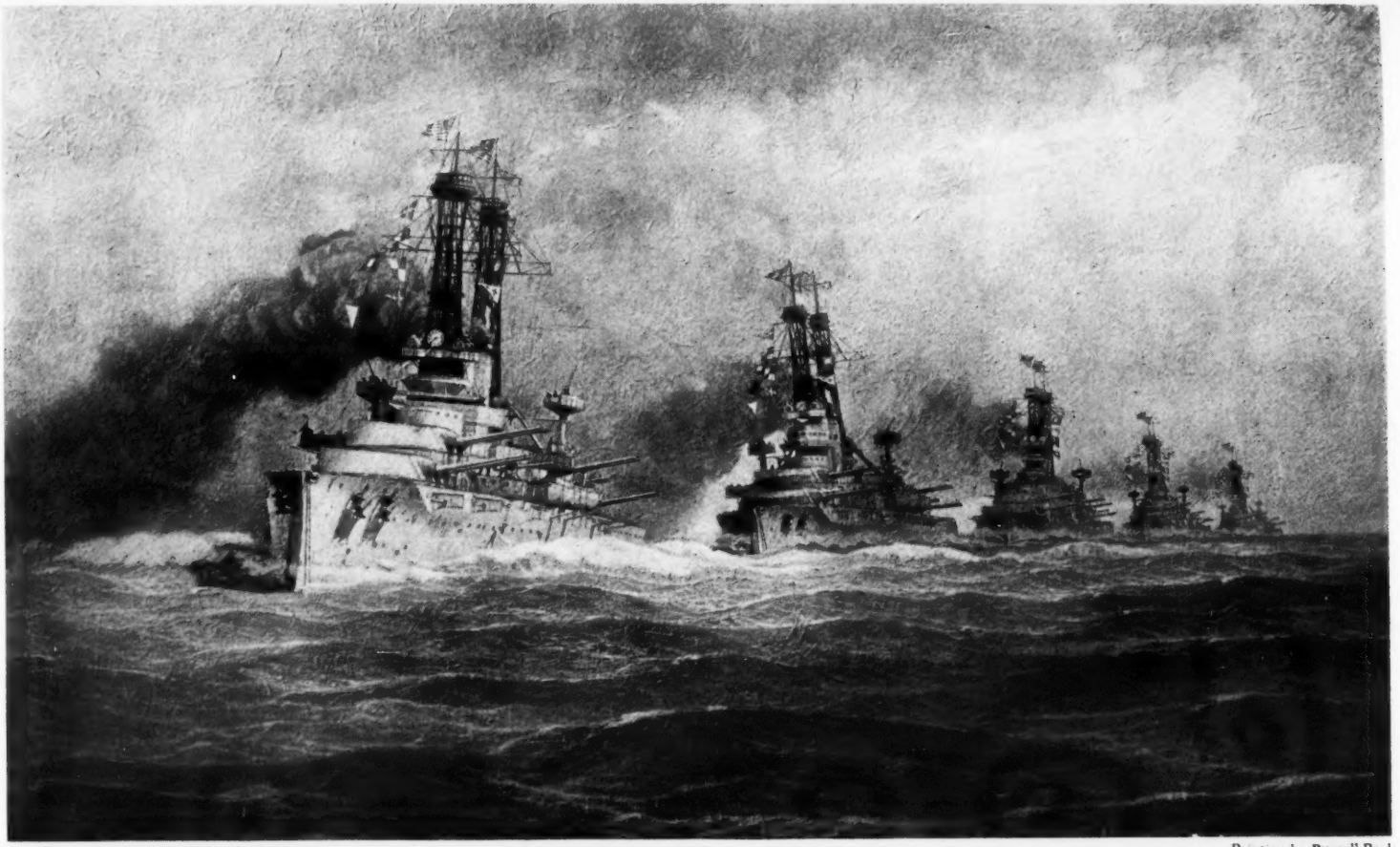
Courtesy of Naval Historical Foundation.

U.S.S. *CALIFORNIA*
The flagship of the battle fleet.

Painting by C. R. Patterson

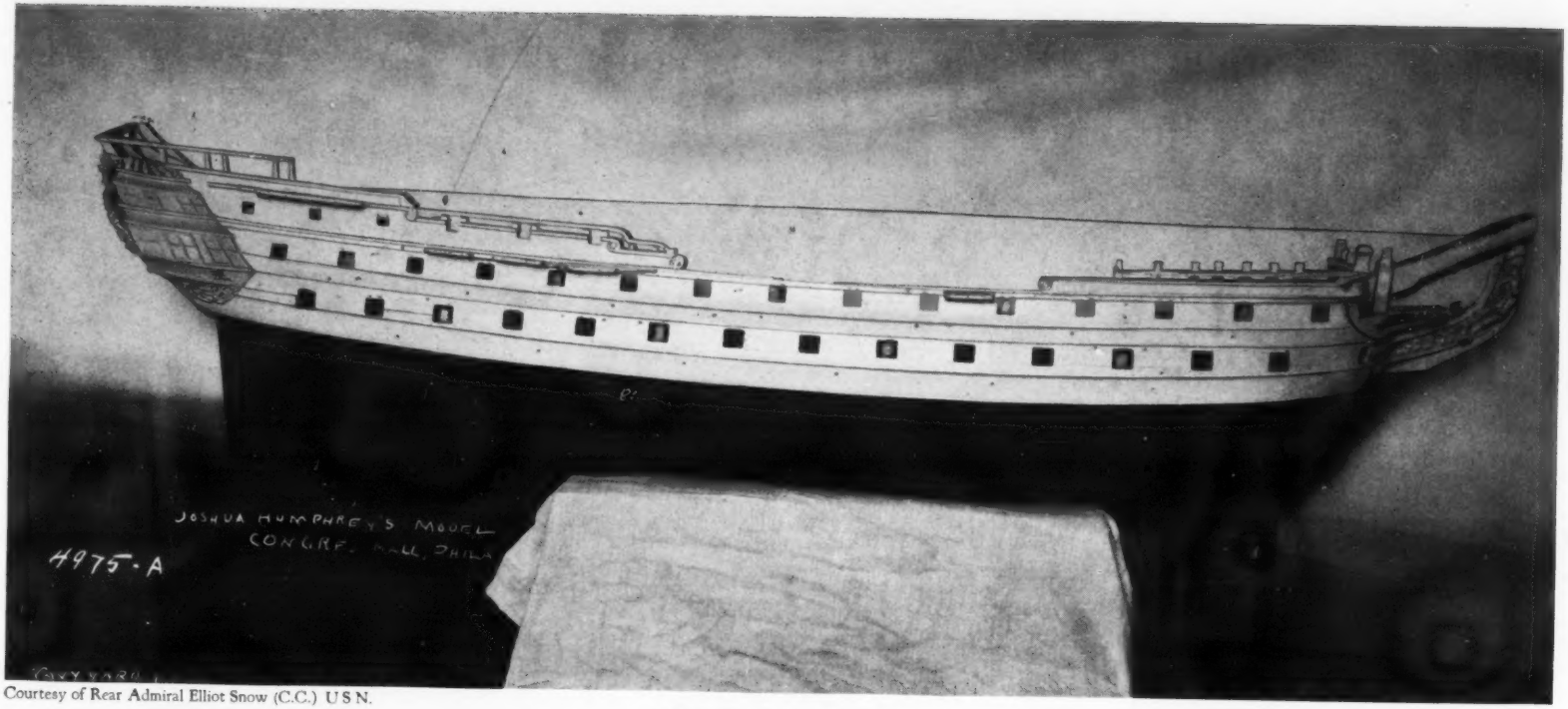
Painting by C. R. Patterson

U.S.S. *CALIFORNIA*
The flagship of the battle fleet.



Painting by Burnell Poole

THE SIXTH BATTLE SQUADRON
Which operated with the British Grand Fleet during the World War and was composed of the *New York*, *Texas*, *Wyoming*, *Arkansas*, *Delaware* and *Florida*.



Courtesy of Rear Admiral Elliot Snow (C.C.) U S N.

MODEL OF "THE AMERICA"

Our First Line-of-Battleship

By REAR ADMIRAL ELLIOT SNOW, *(CC), U. S. Navy (Retired)*

IN A SPACIOUS old Colonial house of Portsmouth, New Hampshire, standing deep-shaded by elms far back from the street, at whose foot the tides of an ancient port are visible, there is shown and cherished today the stately room where the Chevalier John Paul Jones lived one hundred and forty years ago while superintending the completion on John Langdon's Island (Rising Castle) of the *America,* seventy-four guns, the first ship-of-the-line of the United States Navy.

These were the words used by the late Winthrop L. Marvin to introduce one of his *Famous Sea Anniversaries* entitled "Paul Jones and the Building of the America." The "model of a seventy-four-gun ship of the Revolution," with which this "anniversary" was illustrated was probably of English design, but it represented in a fairly good way our first ship-of-the-line.

The *America* was the first vessel in our naval service to bear the name of this continent of the Western Hemisphere, but not so with the English Navy, when we were one of England's colonies. The first English naval vessel to bear the name *America* was a small craft of about 180 tons purchased by the British Admiralty from Mr. Gerrald in 1739 and was converted into a fire ship which afterward bore the name H. M. S. *Blaze;* the second was the forty-four-gun British frigate built by Admiralty contract at Portsmouth, N. H. A beautiful model is in the Portsmouth Athenæum.[1] It happened though, that the next vessel bearing the name "America" was also built and launched at Portsmouth, New Hampshire, our own ship-of-the-line, commenced when the colonies were struggling for their independence, but not completed until after the announcement of peace with the mother country.

The launching of this beautiful ship was reported by the local paper as taking place on November 5, 1782:

On Tuesday the fifth inst. was launched at this place, without any accident, the beautiful ship *America,* of seventy-four guns. This ship is considered by all good judges as one of the best pieces of work ever done in America and not inferior to any elsewhere. The master builders and other workmen who have been employed in this business for a long time have been indefatigable and persevering, and have gained themselves great credit in turning out of their hands such a complete ship. The Honorable John Langdon, Esq., agent for the United States, who carried on the building of this ship by advancing large sums of his private stock, and his patriotic exertions, through the course of his business in the worst of times, has done himself great honor and rendered essential service to the public.

The Chevalier Jones, who has resided in this town for some time past (by particular request of Congress) as inspector of ship *America,* having finished his mission with credit to himself and his employers, set out on Wednesday last for Philadelphia.

The vessel thus launched, although intended to sail under the command of Paul Jones, was destined never even to fly the stars and stripes. The reason Jones "after having finished his mission" set out at once for Philadelphia, is to be found in the following letter from Robert Morris. He was possibly hastening to Philadelphia to learn from the lips of Morris the reasons of state which governed the adoption of the Resolution of Congress of September 3, 1782:

MARINE OFFICE
September 4, 1782

CHEVALIER JOHN PAUL JONES,

Dear Sir: The enclosed resolution will show you the destination of the ship *America.* Nothing could be more pleasing to me than this disposition, excepting so far as you are affected by it. I know you so well as to be convinced, that it must give you great pain, and I sincerely sympathize with you; but, although you will undergo much concern at being deprived of this opportunity to reap laurels on your favorite field, yet your regard for France will, in some measure, alleviate it, and to this your good sense will naturally add the delays which must have happened in fitting this ship for sea. I must entreat of you to continue your inspection until she is done. If you will come hither, I will explain to you the reasons which led to this measure, and my views for employing you in the service of your country. You will on your route, have an opportunity to confer

[1] This is not a model of our first ship-of-the-line *America* as heretofore some believed it to be.

with the General, on the place you mentioned to me in one of your letters.

I pray you to believe me,

Your Affectionate Friend &c

ROBERT MORRIS.

The resolution of Congress enclosed in Robert Morris' letter as will be seen gave the reason as being the desire of Congress of testifying to His Majesty (Louis XVI) the sense they entertained of his generous exertions in behalf of the United States.

In Congress, September 3, 1782.

WHEREAS, the *Magnifique*, a seventy-four-gun ship belonging to His Most Christian Majesty commanded by the Marquis de Vaudreuil, has been lately lost by accident in the harbor of Boston, and Congress are desirous of testifying on this occasion to His Majesty, the sense they entertain of his generous exertions in the behalf of the United States.

Resolved: That the Agent of Marine be, and hereby is instructed to present the *America*, seventy-four-gun ship, in the name of the United States, to the Chevalier de la Luzerne, for the service of His Most Christian Majesty.

What Robert Morris said to Jones may never become known. We do know, however, some of the immediate circumstances of the disaster, which was referred to in the opening sentence of this resolution, and the subsequent history of the wreck.

After the defeat of the Comte de Grasse in the West Indies a section of his fleet (fourteen sail in all) under Admiral Vanbiard arrived in Boston, August 11, 1782. *Le Magnifique* when entering the narrows stranded on the bar at Lovell's Island. Many fruitless attempts have been made to secure the treasure from the wreck. An attempt made about 1840 gave no return except some beautiful specimens of wood; in 1859 (July) another attempt yielded copper, lead and some cannon shot. In 1868-69, when General Foster of the United States Engineer Corps of the Army widened the main channel, the dredges brought up large pieces of oak timber and plank from a depth of twenty feet, believed to have been part of the hull of *Le Magnifique*.

The pilot in charge of *Le Magnifique* afterward became sexton of the New North Church and was frequently taunted by willful boys by chalking this couplet on the meeting house door:[3]

"Don't run your ship ashore
As you did the seventy-four."

Paul Jones was not the first nor the only prospective captain to experience disappointment through the *America*. On November 6, 1779, the Marine committee appointed Captain John Barry to her command with the following instructions:

SIR: As you have been appointed to command a new Continental ship (the *America)* that is now on the stocks at Portsmouth, in New Hampshire, you are directed to repair to that place and hasten, as much as will be in your power, the completing of that ship, which we are desirous to have done with all possible dispatch. We have now communicated our desire on that head to the honorable, the Navy Board at Boston, whom you will please to call on, on your way, and receive such orders as they may think proper to give you.

Should Mr. Langdon and you agree that any alteration can be made in this ship that will render her more suitable than the present design you will please to communicate your plan, and a state of the ship, which we will consider.

Work on the *America*, however, still dragged along slowly, very slowly, indeed, owing to lack of funds, inability to secure skilled artisans and the absence of a supply of seasoned timber. A year or so rolled by and finally Captain Barry was appointed to the command of the *Alliance*, then in Boston, September, 1780.

Robert Morris, too, must have been disappointed. The commissioning of the *Alliance*, however, carried with it the hope of accumulating funds wherewith the *America* could be completed.

A committee of the Continental Congress consisting of Mr. Clymer, Mr. Sullivan and Mr. Matthews, to whom had been referred two letters from Robert Morris reported:

That Robert Morris, Esq., be and hereby is authorized and directed to take measures for speedily launching and equipping for sea the ship *America*, now on the stocks at Portsmouth, New Hampshire, that the Board of Admiralty be and they are hereby directed to assign to Mr. Morris the proceeds of the shares of the United States in the prizes taken by Captain John Barry to enable Mr. Morris to carry into execution the preceding resolution: That Congress proceed Tuesday next to appoint a commander to the said ship *America*.

The selection and appointment of a commander was carried out on Tuesday, June 26, 1781. When ballots were taken John Paul Jones, Esq., was unanimously elected. A little more than two years after this, as has already been recorded, the Chevalier Jones was disappointed at not receiving command of the *America*. The motion to present "His Most Christian Majesty" with the *America* was made on September 3, 1783, by Mr. Osgood and seconded by Mr. Williamson.

The building of the vessel of unseasoned timber, was due to expediency, it was a war measure and no blame can justly attach to any one connected with her. The effect of using green timber is told in "The True Story of the *America*," by Robert W.

[3] *The Memorial History of Boston, 1630-1880.*

Neeser, published in the PROCEEDINGS in 1908. Briefly this vessel which at one time was adjudged "to be as good a piece of workmanship as any European power" could boast of, was condemned to be broken up about three years after she first flew the French flag.

That this new accession to the fleet of His Most Christian Majesty, Louis XVI, lingered around Portsmouth long enough to take part in the general rejoicings at the proclamation of peace is shown by an old newspaper in the Boston Athenæum:

Monday, April 28, 1783, when peace was proclaimed in Portsmouth amidst general rejoicings, the day was ushered in by the ringing of bells. At six o'clock salutes of thirteen guns were fired at the fort, at Liberty-Bridge, and at Church-hill, to which His Most Christian Majesty's ship, the *America*, responded in joyful harmony.

Not long after this, the *America* sailed, never again to visit her native land, but before leaving, the ship was the scene of gay festivities in the shape of a farewell dance and supper given on board, June 7, 1783.

About 1904 an invitation was discovered by Charles C. Hall, great-grandson of George Wentworth (not "Georges" as in the invitation), hidden between the leaves of an old book in the historic Wentworth House on Pleasant Street, Portsmouth, where he resides. This house was the home of the late Ebenezer Wentworth, son of George, grandson of Daniel, and great-grandson of Lieutenant Governor John Wentworth—the same house occupied by Governor John when the Revolution broke out.—Boston *Evening Transcript* of July 11, 1908.

The invitation, a valuable relic and genuine curiosity in its quaint French-English, is reproduced below, no change having been made in the original punctuation or spelling.

Macarty's respectful Compliment wait upon Madam Georges Wentworth and Miss Wentworth, Begs the Favour of their company, next friday evening 6th of June on Board the ship America, where there shall be a dance & supper.

At Seven o'clock, Immediately after the Firing of a salute, there shall Be Boats at all moments, attending on the ladies & gentlemen, at General Whipple's wharf.

Answer if you please.

Friday, 30 May 1783.

Then came the fond farewells; the *America* "fell down the river" from Portsmouth, June 24, 1783. She arrived at Brest, France, after a fine passage of twenty-two days. These events were announced thus on local papers.

Portsmouth, June 28, 1783.

Tuesday last (June 24, 1783) fell down the river His Most Christian Majesty's ship *America*, of seventy-four guns, commanded M. LeChevalier de Macarty Martigne. She is allowed by judges, to be as good a piece of workmanship as any European power can boast of.

Philadelphia, November 25, 1783.

On Saturday last John Thaxter, Esq., private Secretary to the honorable, Mr. Adams, arrived from l'Orient (France) via New York, where he was landed from on board the French packet, the *Courier de Europe*, which left France on the 26th September. This gentleman comes with official dispatches to Congress from their ministers in Europe; and brings the definite treaty of peace between Great Britain and America.

The treaty of commerce was not concluded when the packet left France.

We have it from a French gentleman of distinction that the ship *America*, of seventy-four guns (presented by Congress to our good ally, the king of France), arrived at Brest from Portsmouth, New Hampshire, after a fine passage of twenty-two days. She is an excellent ship, a fine sailer, and is greatly admired by the naval officers at Brest.

To round out this story of our first ship-of-line necessitates, at this juncture, that the reader depart from chronological sequence and look backward to 1779 and give his attention to a newspaper account of August of that year.

On the 9th of November, 1776, Congress ordered "the building or purchase of three ships of seventy-four guns," besides several frigates and vessels of smaller dimensions. The keel of one of these ships was laid in Boston, and some progress made in her construction, but the only one that was completed and launched was the *America*, seventy-four, built at Portsmouth, New Hampshire. She was not only the first ship-of-the-line built by the United States, but the first ship of that class ever built on the continent, of which we have knowledge. Soon after the order of Congress her keel was laid on the northwest end of an island called Rising Castle, long known as Langdon's or Governor's Island, and now called Badger's Island, where the ways on which she rested are still to be seen. The Honorable John Langdon, who was the continental agent for building vessels and a member of the Marine Committee it is understood generously and patriotically tendered the use of the island. Col. James Hacket was her master builder, and, though he had never seen a ship-of-the-line, drew the plans for her construction. As he never had more than twenty carpenters at work upon her while her construction was in progress, it was necessarily slow. A year and a half after her building was authorized, on the 29th of May, 1778, at the suggestion of Captain Landais, the Marine Committee, the Honorable John Langdon being one of its members, reported in favor of her being "constructed to carry fifty-six guns only, upon two batteries, that is to say, twenty-eight twenty-four pounders upon the lower deck and twenty-eight eighteen-pounders upon the upper deck." Had this report been adopted, which it seems was not, she would

have been the heaviest armed frigate of her time afloat.[3]

From the account just quoted, one might infer that Colonel James Hackett, who "drew the plans for her construction" was also the designer of our first "seventy-four." That he did not design her, seems now to be fairly well established, as will shortly be pointed out. Colonel Hackett did, however, most justly enjoy an enviable record as the builder of the *America* and many other vessels. Our authority for this is again the Portsmouth weekly paper.

Colonel Hackett may be accounted as one of the most experienced master builders in the union. During the late Revolutionary War he built for the United States the following ships of war:

The *Raleigh*, frigate, 750 tons, thirty-two guns; *Portsmouth*, 300 tons, eighteen guns; *Ranger*, 300 tons, eighteen guns; *Bellona*, 300 tons, eighteen guns; *America*, 1700 tons, seventy-four guns.

And since the 25th of October, 1796, he has raised, finished and launched the following ships:

The *Crescent*, frigate, 600 tons, thirty-six guns; *Scannel*, revenue cutter, 130 tons, fourteen guns; *Portsmouth*, 480 tons, twenty-four guns; *Congress*, 1250 tons, thirty-six guns.

What naval constructor can show a nobler list? Whose workmanship will compare with Hackett's? Let government examine the bills and determine whose are cheapest. An experienced, tried, faithful servant merits constant employ.

The superintendent of the John Langdon's ship yard, in which Col. Hackett built the *America*, was Captain Tobias Lear, of Portsmouth. He served in that position from May 10, 1777, to May 12, 1781.[4]

As the keel of the *America* was laid early in 1777 and as in that year Joshua Humphreys made a half model of a seventy-four-gun-ship and as his letter books contain the complete record of offsets and dimensions of the seventy-four gun ship taken from the mold loft floor, it would seem fairly clear that "the father of our first frigates" was also the designer of the *America*. The half model of the seventy-four gun ship is today to be found in Congress Hall, Independence Hall in Philadelphia. On the rear face of the board, on which this half model is mounted, are carved the words "Joshua Humphreys fecit 1777."[5] The writer has concluded that the model probably served as the basis of the design of the *America*. In those days it was the practice to make a model of the ship before building it.[6]

It is rather odd that a model of such antiquity and of its historical value should have remained so long unheralded in any way. For many years it hung over the dining-room door in the old home of Joshua Humphreys at Port Reading on Haverford Road, just below the present town of Ardmore, Pennsylvania. In 1898, it was given to the Navy Department and finally found its way to the Department of Construction and Repair at the Navy Yard, Washington, D.C. At that time the model was erroneously thought to be a representation of the seventy-four gun line-of-battleship *Ohio* and class, built after the War of 1812. Some time afterward, the Navy Department at the request of the donors, returned it to them and it was then bestowed by them on the National Museum of the city of Philadelphia and was placed in Congress Hall. No other model of the *America* is known to exist.[6]

[3] It was on the advice of John Barry that John Langdon decided to carry out the original plan of building a "seventy-four."

[4] Captain Tobias Lear was the father of Washington's private secretary, Colonel Tobias Lear.

[5] The "dimentions of the seventy-four gun ship" are to be found in Joshua Humphreys' letter book 1797-1800. Pennsylvania Historical Society, Philadelphia, Pennsylvania.

[6] Another contemporaneous model existed probably until the time of the burning of the Masonic Museum in Alexandria, Virginia. The model was made by one of the French officers of the *America*, and was presented by him to Washington. Washington gave it to his brother-in-law George Custis, who, about 1812, deposited it in the Museum at Alexandria, Virginia.

The Tale *of the* Lost Torpedo

By CAPTAIN STANFORD E. MOSES, *U. S. Navy (Retired)*

FROM FLORIDA the coast of the Gulf of Mexico trends westward beyond the Mississippi delta and Galveston and down to Yucatan. In the bight formed by the Yucatan peninsula lies the historic old city of Vera Cruz, the "City of the True Cross." It was from Vera Cruz that Cortez marched upon his conquest of Mexico in the sixteenth century. From the same port, centuries later during the Mexican war, our Army began its march to plant the American flag over the halls of the Montezumas.

Early in 1914, shortly before the outbreak of the World War, diplomatic relations between the United States and Mexico again became strained. President Madero, of Mexico, had been assassinated and Woodrow Wilson objected to the recognition of Madero's successor, President Huerta. Mexico's treatment of Americans finally led to the seizure of Vera Cruz by American forces and our fleet occupied the port. The military and naval operations were not of sufficient importance to seriously interfere with the scheduled maneuvers and training of the fleet after the Army had arrived to take over the control of the city. The ships in the harbor or in the offing came and went "upon their lawful occasions," very much as usual.

One day the battleship *Texas*, then new and on her first cruise, arrived to join the fleet. She was soon hard at work under an energetic and driving captain, drilling the new crew and preparing herself for that record in gunnery and engineering efficiency which has rarely if ever been excelled. Just how keen the rivalries in gunnery were in those days may best be illustrated by a short story of somewhat earlier times. The battleships *Oregon* and *Wisconsin* were once competitors for the gunnery trophy, out in Manila Bay. The *Wisconsin* fired her target practice first and made only one hole in the target with each pair of heavy turret guns; every shot going through the bull's eye. The *Oregon* was scheduled to fire the following day and her only hope of victory was to fire with equal accuracy and with greater speed. That night, smallpox broke out in Manila and target practice was suspended until all hands had been vaccinated. Vaccination might cause sore arms, and thereby interfere with handling the guns at target practice; so a "disinfecting station" was secretly prepared on the *Oregon* where vaccinated members of the guns' crews might remove any danger of sore arms. Later, when this *"ruse de guerre"* was discovered, the explanation given was that it was preferable to risk smallpox rather than endanger the ship's chances of beating the *Wisconsin*.

To return to Vera Cruz: when the *Texas* first joined the fleet the ship had not yet received all of her crew on board. The officers and men were still quite new to one another, almost strangers, and a draft of 200 more recruits arrived by transport from New York and joined the *Texas* off Vera Cruz. No sooner had the new men been mustered on the quarterdeck and their hammocks, bags and ditty-boxes accounted for, than the ship got under way and stood over across the harbor in the direction of Anton Lizardo to test her torpedoes. It was a beautiful evening. There was a quiet stillness in the air; overhead the birds were flying southward; and in the far distance, behind the white walls of the old castle of San Juan de Ulloa, the high peak of Orizaba, "The Star Mountain," stood out, clear-cut against a golden sunset. Only the experienced seaman knew that these three signs were indications of a coming storm; the quiet air, the flying birds and the clear-cut profile of the distant mountain. Within a day or two of these forewarnings, the dreaded "norther" may descend. These "northers," while not dangerous to a ship prepared to meet them, are terrifying to the novice, even though he may be protected from the elements by the staunchness of his

ship. The wind rushes down with hurricane force, with torrents of rain, thunder and lightning, and occasionally small blue lambent flames may be seen to flicker at the weather yard arms, the wind at the same time flying about in all directions in furious gusts.

The *Texas* anchored that evening off Anton Lizardo, only a few miles from Vera Cruz, and began preparations for her torpedo practice, to be held on the following day. Anton Lizardo, although its waters are infested with savage man-eating sharks, was selected for this work because the depth of water made it possible to recover a torpedo which might sink; or if a torpedo should overrun its distance, the probabilities were that it would be recovered by searching the long white sandy beach a few miles inshore that stretched away towards Vera Cruz. When a torpedo is fired and runs true to form, its path for miles is easily discernible by means of its clear white wake. If it sinks there is no wake, but bubbles rising to the surface may indicate the spot, and preparations are always made in advance to mark the place in order that the torpedo may be recovered.

On this occasion one of the torpedoes from the *Texas* was seen to sink alongside, quite close to the ship, and a buoy was placed to mark the spot. Then motor launches equipped with sweeps and grapnels dragged the bottom in all directions, but failed to find the lost torpedo. The monetary value of a torpedo runs into thousands of dollars, but there was another and more serious consideration. A lost torpedo would mean a zero factor entering into computations for the ship's score in the gunnery competition. The gravity of the situation in the eyes of an ambitious captain can now be more fully appreciated. The torpedo was somewhere and it must be found. Evening was again approaching. The quiet stillness of the air remained and the "Star Mountain" peak again raised 18,000 feet in air its warning finger against a cloudless sky. There were no birds; they had flown south to safety. The captain was troubled. The lost torpedo and the weather warnings were on his mind, and the ship was scheduled to go to sea with the fleet on the following morning for maneuvers; her first day of maneuvering with the fleet. This is always a trying and tense day for a new, or "rookie" ship. It was decided to leave a motor launch at Anton Lizardo to search for the lost torpedo while the *Texas* went out to sea with the Fleet. The torpedo officer was to be in charge of the search party. It was suggested that the torpedo might have freed itself from the sandy bottom and run ashore, or might have drifted on the beach. The search was to continue all day, if necessary, and extra men were assigned to the motor launch to keep a constant lookout.

That night, almost exactly at midnight, the "norther" broke over the harbor with great violence, to the usual accompaniment of wind squalls, thunder, lightning and torrents of driving rain. It gave the officer-of-the-deck and the anchor watch a busy and anxious quarter of an hour, while the relief watch lent a hand with the hurried work of securing boats and awnings and hauling over hatch covers and tarpaulins. The squall soon spent itself and passed, leaving the rain-washed air quite still again and the tropic night apparently serene. Then the watch was relieved. One of the officers said to the other, "I thought I heard a cry for help just about the time that the squall broke; but it must have been the bosn's mate rousting out the anchor watch." Then he went below. But what he had heard was not the bosn's mate calling the anchor watch; he had in reality heard a call for help. The mid-watch passed and in the morning watch the torpedo officer left the ship in the motor sailer with a working party to search for the lost torpedo, and to recover it if possible.

At eight o'clock the ship got under way and stood out to sea for maneuvers. At muster that morning two of the new recruits were reported absent. Nobody knew them. With the ship so recently commissioned they were, as far as the rest of the crew were concerned, mere names on the roster of more than a thousand men. There had not as yet been time for them to make any friends, or even to become acquainted with their shipmates. But to the captain it was a very different matter; he was responsible for their welfare and for their lives. The two missing men were supposed to have come on board the day before with the big draft of recruits the transport had brought from New York. Someone else might have answered their names by mistake, or inten-

tionally, when the draft was mustered. The two men had been assigned, by name, to a certain division, but at the first muster of that division they failed to appear. The question arose as to whether the men had actually been received on board. Meanwhile the new ship, maneuvering for the first time with the fleet in the battle line, absorbed the time and attention of the captain. Now and again a lull permitted further inquiry in regard to the missing men.

A curious story grew from rumor and surmise until it seemed to offer at least a possible solution of half of the mystery. The rumor was that one of the men had fallen overboard and was drowned. But that offered no explanation of the disappearance of the other man. The long and anxious day began to draw to its ending. The fleet stood in from sea and the *Texas,* swinging out of column, stood over toward Anton Lizardo. The motor launch which had been left to search for the lost torpedo was seen to be at anchor near the spot where the torpedo was supposed to have sunk. The only hope—and that a faint one—was that the missing men might be in the launch, although they had not been detailed as members of its crew. A signal was sent to ask the torpedo officer whether the men were in the boat, and this was the answer, quickly semaphored back: "Yes, we picked them up." "Alive or dead?" "They are both alive." "Come alongside and bring them on board." There was a slight delay on the part of the launch in starting back to the ship, and then up the gangway and through a wondering crowd came the torpedo officer and two pitifully bedraggled youths. Investigation and search of the ship at intervals during the day had focused attention upon the missing men and the ship's company was on tip-toe with interest and excitement.

Let the torpedo officer now tell his story. After leaving the ship that morning the motor launch had headed inshore for the beach, several miles distant, hoping to find the lost torpedo stranded there. A lookout was stationed in the bow of the boat, and as they approached the shore line the bow lookout called, "Man overboard." The engine was reversed and the coxswain ran fairly alongside of a man in the water and hauled him aboard. They asked the rescued man, or boy, what ship he was from, and to their astonishment he replied, "From the *Texas,*" and fainted. The dumbfounded crew of the launch were not allowed to stand lost in amazement, for the bowman cried, "Look, there's another one," and they hauled the second man aboard. The castaways were fed and allowed to rest in the launch all day, but they were still very weak when they marched up on the bridge to face the irate captain. A kindly heart lay under the captain's bluff exterior and the boys were placed under the care of the ship's surgeon and allowed to sleep in the sick bay until they recuperated. Then, at the mast, they told the captain their story. Not uninterruptedly, but with occasional characteristic remarks and questions from the captain. "We wanted to go home," said the spokesman. "And where is 'home'?" asked the captain. "Brooklyn," said the boy. "My God!" said the captain, "I've heard of people being homesick; but I never before heard of anybody being that anxious to get back to Brooklyn!" The story proceeded. The two boys had come aboard two days before with the draft, and had felt lost and homesick among a thousand strangers and in a new environment. After the long sea voyage from New York to Vera Cruz on the transport—their first experience at sea—the shores of the harbor, under the shadow of the lofty mountains, seem invitingly near. They decided to swim ashore and go home—to Brooklyn! That the Mexicans were hostile and would probably shoot them on sight, did not deter them. That there were other insuperable difficulties and dangers did not occur to them. They were going home—that was all. Those who understand the extremes to which nostalgia will drive its victims will hardly be surprised. It leads strong men at times to the borderline of insanity and to the grave. The human adjustments necessary on a newly commissioned battleship offer an interesting field of study to the psychologist. There was on the *Texas* at that very time a man in the full maturity of his powers, a man of fine character and training, who had actually proposed to attempt the same wild venture the boys had attempted; but he was prevented. Of the two boys, one could not swim. The other was not an expert swimmer. They decided to leave the ship at midnight, and did so. They had twenty dollars between them, which they divided equally. Ten dollars each—if they got

ashore—for the trip from Vera Cruz to Brooklyn, through hostile Mexico! Their uniforms of blue, so brightly new, they rolled and tied upon their shoulders, to the life preservers, "to try to keep them dry!" Then, "at midnight, in the silence of the sleep-time," they lowered themselves gently from the propeller booms near the stern of the ship, and slipped unobserved into the shark-infested waters. Even if they had known enough to detect the ominous signs of the oncoming "norther," they were too wholly engrossed in avoiding detection to note the signs of bad weather. Once in the dark water their hearts began to fail them; and no wonder! The tidal current swept them astern, and as the lights of the sleeping ship and the loom of its great dark hull began to recede, they cried aloud for help. It was too late. Just as they called there was a flash of lightning, followed by the crash of thunder and rush of wind and rain. The promised "norther" had arrived at last. The boys continued to call for help, but their voices were drowned by the noise of the thunder and wind and by the driving sea. For eight hours they drifted helplessly. After the motor launch picked them up and the boys had rested sufficiently to give some account of themselves, they said that ever since daylight "great big fish" had been swimming slowly around them. The sharks! Only heaven knows why the sharks did not devour them.

Only one thing more remains to be told. When the signal was sent to the torpedo officer to bring the absentees on board the *Texas*, the launch had some difficulty with its anchor, so the anchor chain was buoyed and slipped. Later, when the launch returned to the buoyed spot to recover the anchor they hoisted with it the lost torpedo. Thus the lost torpedo was recovered by a fluke, for the fluke of the anchor was hooked neatly around the end of the tail.

Turning *into the* Track *of the* Guide

By CAPTAIN O. L. COX, *U. S. Navy*

WHEN do we turn? That is the question of vital importance to the commanding officer or unit commander when executing a maneuver, at the completion of which, the ship or ships will be in their proper position in relation to the guide.

Many valuable papers have appeared in the PROCEEDINGS, which give the various operations on the mooring board and explain in detail how to obtain your course and speed to go from "Where you are" to "Where you want to go."

I have seen only one paper, however, which deals with the most important part of the whole maneuver, "When do we turn?" In the paper "Hints on Tactical Maneuvers," by Lieutenant Commander (now Commander) Jules James, U. S. Navy, there is included a table giving the "Degrees of Bearing Loss in Turning." This table is only approximately correct and requires considerable interpolation. In fact, it requires plotting, in order to know your distance from the guide when you execute the turn.

Take, for example, the case of a ship which is directed to change distance from the guide and retain the original bearing. Under this condition, there are no degrees of bearing lost in turning.

A ship is on the starboard bow of the guide, distant 10,000 yards and is directed to take station on the starboard bow of the guide, distant 5,000 yards, using same speed as the guide. Laying this problem out on the mooring board you find that the ship turns to the left ninety degrees and that the *relative movement* line is the line joining the present position of the ship and guide. There is a loss of distance (advance) but no loss of bearing on the turn up to base course, though the turn was one of ninety degrees.

With the use of the universal drafting machine, all maneuvering problems can be placed quickly and accurately upon the mooring board. In addition, the operator has before him at all times a visible record of his previous work. The use of parallel rulers is not as satisfactory nor as rapid as that of the drafting machine. The use of the mooring board is considered superior to all other apparatus such as the Battenburg indicator, etc.

Practically all maneuvering of capital ships is done with a rudder angle such that it gives the ship a tactical diameter of 1,000 yards and the following discussion assumes that such tactical diameter is used, though the data can be easily converted for use with any other tactical diameter.

A study of the tactical data of capital ships will show that the following holds true: When the signal to turn is executed, the ship continues on base course for a certain distance and then starts to turn. After a short time, the ship is turning in a nearly perfect circle whose diameter is 1,000 yards. To all intents and purposes, it may be assumed that the ship continues on the base course for a certain distance and then immediately starts turning in a perfect circle of 1,000 yards diameter, base course being tangent to the circle.

At speeds of about fifteen knots, a capital ship continues on base course for about 300 yards before turning. At lower speeds, the amount of "skate" is less and at higher speeds more than this amount. At ten knots it amounts to about 225 yards.

Let the heavy circle of Fig. 1 represent the turning circle of a ship with a tactical diameter of 1,000 yards and assume that the ship, after the completion of a turn, is at point *A* on course of 270 degrees. The figure shows the tactical data at 15-degree intervals for turns to the left from 15 degrees to 150 degrees. Take the case of a turn to the left of 60 degrees. The ship is on base course 330 degrees (60 degrees to right of final course). At what position should the ship execute the 60 degree turn

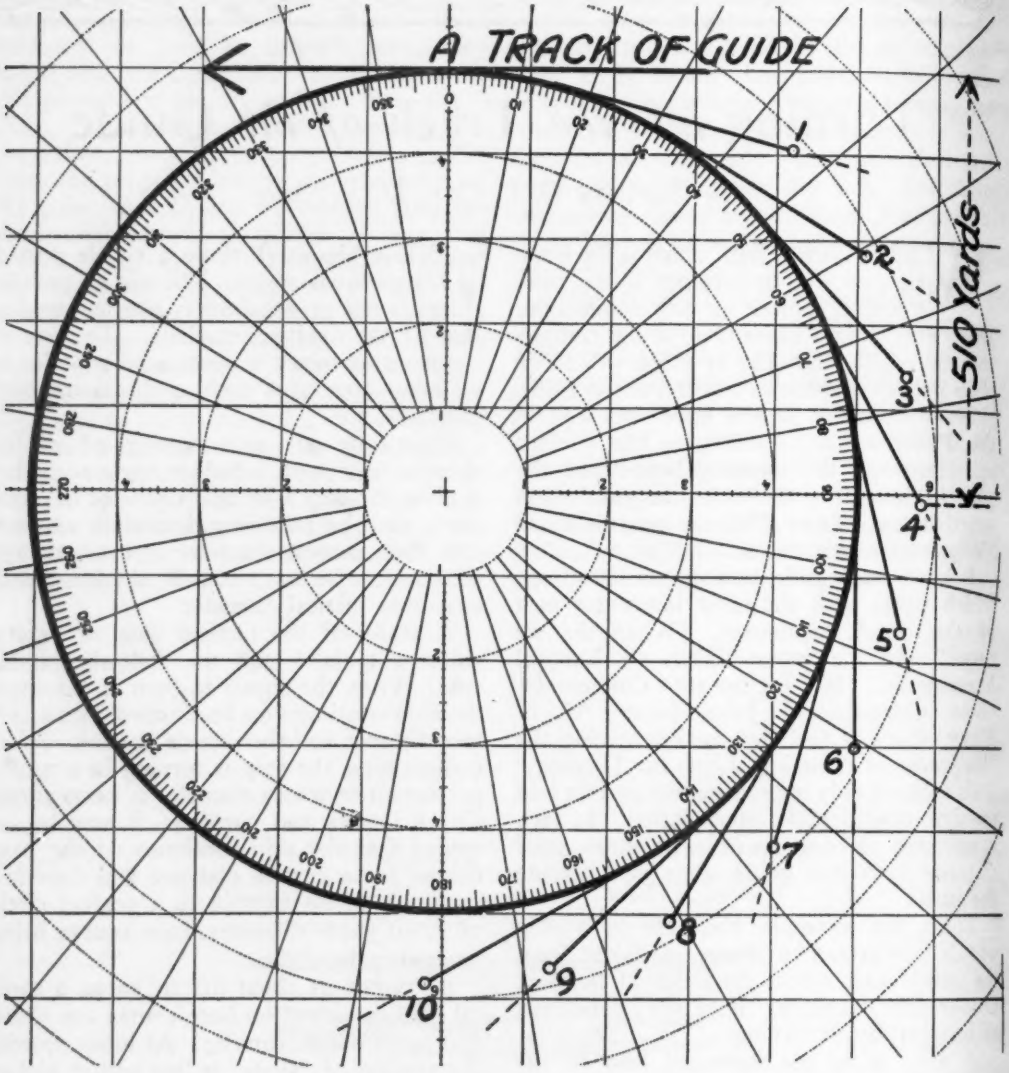


FIGURE 1

in order to arrive at point *A* and straighten out on the new course 270 degrees?

Assuming the speed to be fifteen knots, the ship continues on the original course (330 degrees) for 300 yards when it hits the turning circle and then follows the circumference of the circle around for 60 degrees to point *A*.

At a point on the circumference of the turning circle, 60 degrees to the right of point *A*, draw the tangent (150 degrees, which is the reverse of original course) and lay off a distance of 300 yards. This locates point 4, the position at which to execute the turn in order to finally arrive at *A*. In a similar manner locate point 1 for 15 degrees, point 2 for 30 degrees, etc. The perpendicular distance from points 1, 2, 3, etc., to the line "track of guide" is the distance from the track of the guide that a vessel must be when the signal to turn is executed in order to end up on the track at completion of a turn.

These distances are given in Table 1:

TABLE 1

Degrees Turn	Distance from Track of Guide. (yards)
15	95
30	217
45	359
60	510
75	679
90	800
105	919
120	1010
135	1066
150	1083

An inspection of this table shows that without sensible error, the following "thumb" rule holds good for turns of any amount between 25 degrees and 100 degrees.

The distance in yards from the track of the guide at which to execute the turn signal is found by multiplying the number of degrees of turn by 10 and subtracting 100. For example, a turn of 45 degrees: 45×10—100=350 yards, distance from track of guide. For turns of less than 25 degrees or more than 100 degrees we get by plotting the results from Table 1 as follows:

20° = 150 yards	110° = 950 yards
15° = 100 yards	120° = 1,000 yards
10° = 60 yards	130° = 1,050 yards
	140° = 1,075 yards
	150° = 1,100 yards

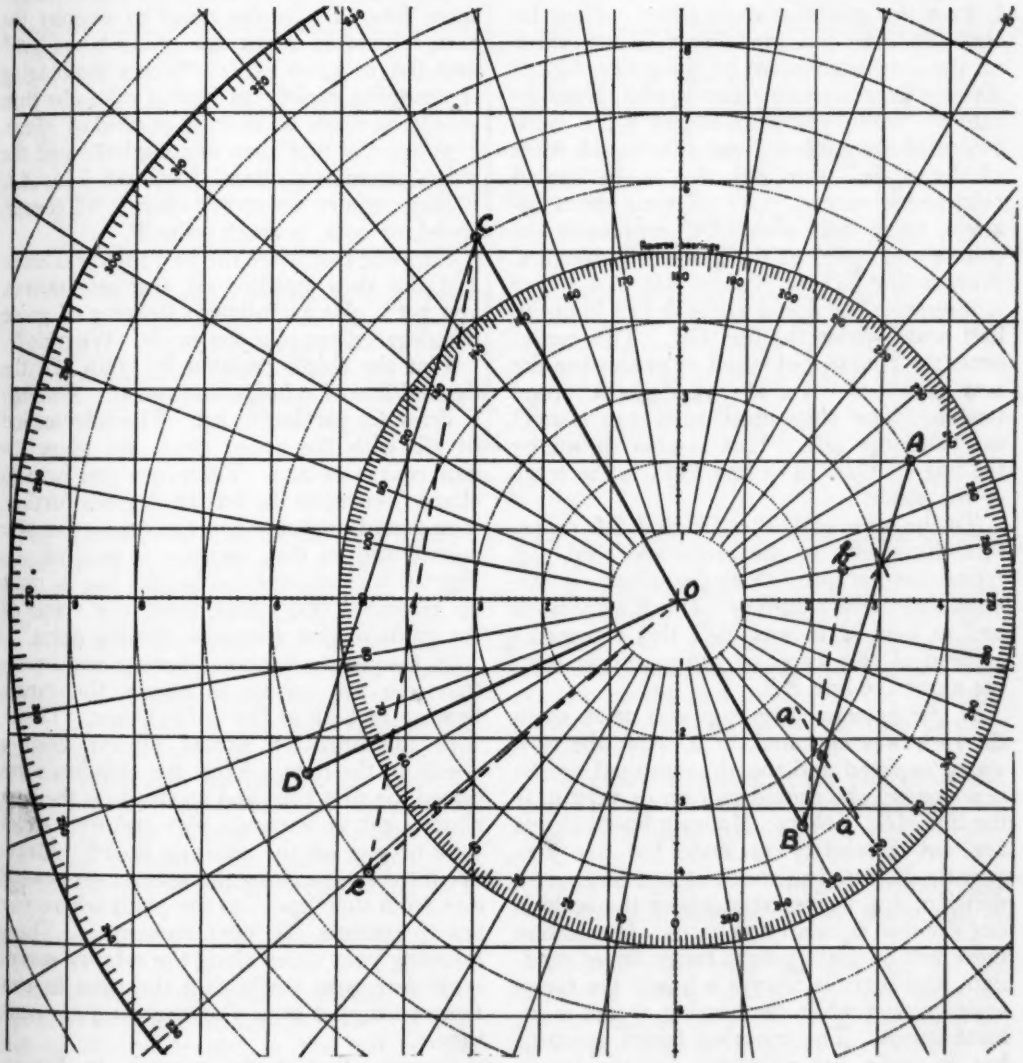


FIGURE 2

These latter are seldom used but can be committed to memory in a few minutes, and, together with the rule given above, cover all cases of turning into the track of the guide, and if applied as explained later on, will insure turning into the track of the guide and prevent many "poorly done" signals.

To illustrate the use of the foregoing. Assume the guide to be on course 330 degrees, speed twelve, and that a ship which is 4,000 yards on the starboard beam of the guide is directed to take station 3,700 yards astern of the guide at a speed of twelve knots. What do?

Fig. 2 shows the mooring board solution. Locate the guide at the center. Then locate "Where you are" at *A*, 4,000 yards on the starboard beam of the guide. Each division representing 1,000 yards. Next locate *B*, "where you want to go," 3,700 yards astern of the guide. Point *B* is on the track of the guide. Join *AB*, this is the line of *relative* movement. Lay off your speed triangle, using half scale; *OC* represents the course and speed of the guide. Through *C* draw a line *CD* parallel to *AB*, and where it intersects the speed circle 6 (12 knots to half scale) draw the line *DO*. This represents the course and speed to proceed to the new position. Course 245 degrees, speed twelve. The ship must turn 330°—245° =85° to the left. This is also shown by the angle *COD*. The line *BOC* is the *track of the guide.*

To the same scale that *OC* and *OD* represent the speeds of the guide and ship, *CD* represents the speed along the *relative movement line.* The length of *CD* is 8.1 divisions and as half scale was used this represents a speed of 16.2 knots or 540 yards per minute along the line *AB*.

If the maneuvering ship was at *A* when the turn was executed, then, after the turn was completed and the ship steadied on the new course, she should plot on or very near the line *AB*. (NOTE: Mooring board sheets are not absolutely accurate but are frequently distorted as much as one tenth of a division, 100 yards error where the scale is one division equals 1,000 yards. In addition there will be variations in range finder readings, and there is always a lag in the range finder report while the bearing report is instantaneous. The mooring board operator has to make due allowance for the lag in range finder readings, which may amount to as much as two or three degrees in bearing if the bearing is changing rapidly.)

In any case, as long as both ships maintain their course and speed, the *relative movement line* will be *AB* or a line parallel to *AB*.

Next locate the point at which to execute the turn back to base course. The amount of turn is 85 degrees and from the previous rule we have 85×10—100=750 yards as the distance from the track of the guide at which to turn. Lay off a line *aa* parallel to the track of the guide, *BOC*, and distant from it 750 yards on the side of approach. Where line *aa* intersects the *relative movement line, AB*, is the point to execute the turn. That is when the guide bears 316° and distant 3,100 yards. Where the bearing is changing rapidly as in this case, the turn should be made on bearing instead of range.

When the first turn is completed and the ship's position plotted, if off the line, *AB*, it may require a further change of course, speed, or both, to reach point *B*.

Suppose that after the first turn was made and the ship steadied on the new course, you get a plot as follows: Bearing of guide 260 degrees, range 2,500 yards. What do?

Plot the ship's position *b*. Join *bB*, the desired line of *relative movement.* Through *C* draw *Cc* parallel to *bB*. The intersection of *Cc* with the speed circle six gives the new course as 229. Therefore you have to change course to the left 16 degrees further. You would probably use 230 degrees as new course and as that requires a turn of 100 degrees back to base course, the line *aa* must be relocated 900 yards from the track of the guide to give your new turning point.

It frequently happens during maneuvers that you are unable to obtain the range, bearing or both at the critical time. Therefore the operator should always keep a check on the time. After the ship has completed the first turn and steadied on the new course, get an accurate plot and note exact time of plot on the mooring board. Measure the distance along the *relative movement line* from this "spot" to the point where you are to execute the next maneuver. Then, knowing your speed along the *relative movement line,* you easily find the time to run from your spot until you execute your next turn.

Suppose that in the example in Fig. 2,

you get a plot as follows: Bearing of guide 260 degrees, range 3,100 yards, watch time $9^h\ 14^m\ 35^s$. At what time do you turn? Locate the spot *X*. Distance from there to the intersection of *AB* and *aa* (the turning point) is 2,900 yards. Relative speed was found above to be 540 yards per minute. It will therefore require $2900 \div 540 = 5.37$ minutes or 5 minutes 22 seconds, and the watch time of executing the turn is $9^h\ 19^m\ 57^s$.

vessel is to the left of that of the guide. θ is the angle in degrees between the courses of the two ships.)

The diagonal dotted lines shown in the figure are *relative movement lines* and several have been drawn in each quadrant as reference or guide lines.

This chart will be found very useful to the officer-of-the-deck when executing 90 degree column movements as it insures turning into the track of the guide, no matter

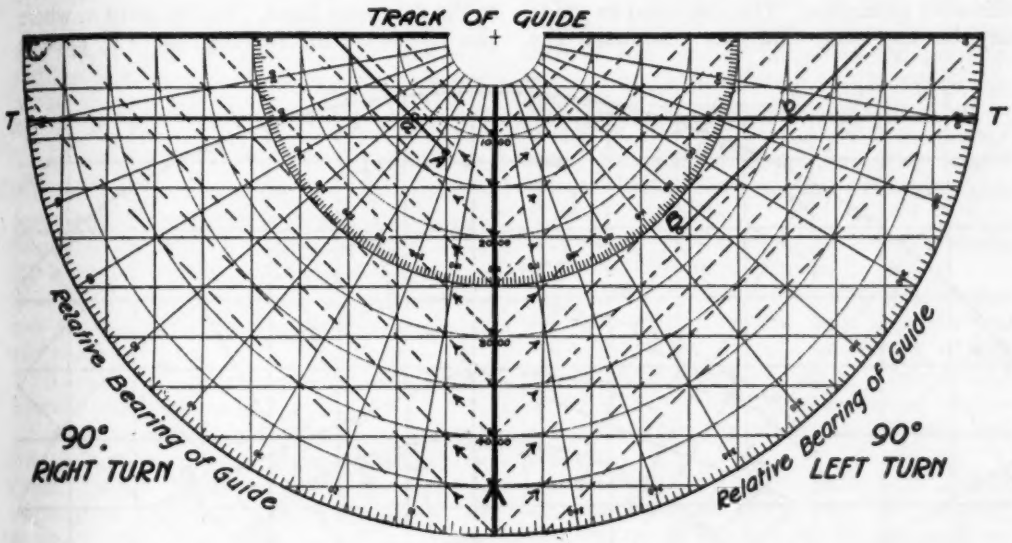


FIGURE 3

Fig. 3 shows a section of the mooring and maneuvering board which is useful for turns of 90 degrees. The left half of the figure is used when the course is changed to the right and the right half of the figure for a change of course to the left. Speeds of guide and maneuvering ship are the same. When the courses of the two ships differ by 90 degrees and speeds are equal, the *relative movement line* makes an angle of 45 degrees with the course of the plotting vessel. (NOTE: Where the guide and plotting ship maintain the same speed, the *relative movement line* makes an angle with the course of the guide equal to $90° + \frac{\theta}{2}$; to the right of the guide's course, if the course of the plotting ship is to the right of that of the guide and to the left of the guide's course if the course of the plotting

whether the ship ahead turns inside or outside.

The guide or ship plotted as guide should be more than 1,200 yards ahead of the plotting ship. At 1,200 yards distance the guide will have practically completed the turn and steadied on the new course by the time the plotting ship arrives at the position to execute the turn.

The guide is located at the middle of the "track of the guide" line and headed to the right for a right turn and to the left for a left turn.

Using a scale of 1 division equals 500 yards gives a convenient size chart and is the scale shown in Fig. 3.

As the turns are 90 degrees in all cases the place to execute the turn is $90 \times 10 - 100 = 800$ yards from the track of the guide. This is shown by the line TT.

Relative bearings are used as they hold

good whatever the true course may be. This assumes that the ship plotting is on her correct course. If off the course, the actual bearing must be adjusted by the amount off the correct course.

The line separating the two quadrants represents the original course. The guide and plotting ship maintain equal speeds (except for loss of speed in turning) throughout the maneuver, and no changes of speed are contemplated.

The use of the chart is illustrated in the following examples. The ship used as guide may be any ship that has completed the turn, but preferably should be the guide of one of the divisions ahead.

Executing a column right 90 degree maneuver, you obtain the bearing and distance of a ship which has completed the turn. Bearing 23 degrees on starboard bow; distance 1,250 yards. How should above ship bear when you execute the order to turn in order to turn up in her track?

Locate point *A*, relative bearing 23 degrees, distance 1,250 yards from the guide. Draw the *relative movement line* parallel to the reference lines. At the point *a*, where this intersects the turning line *TT*, execute

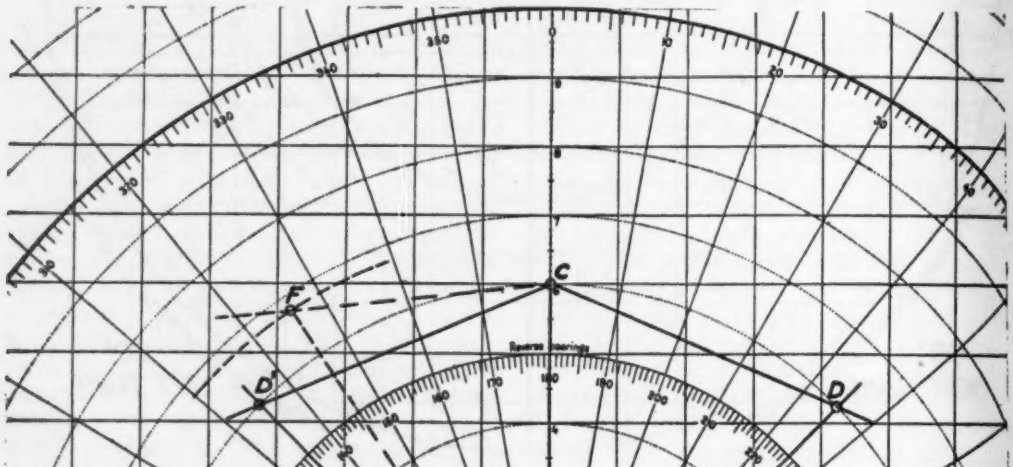


FIGURE 4

the turn. The guide then bears 48 degrees on the starboard bow, distant about 1,200 yards. You will end the turn on the track of the guide and about 1,650 yards astern.

Executing a column left 90 degree maneuver. Relative bearing of guide 315 degrees (45 degrees on the port bow) distant 2,700 yards. Same data required as above.

Plot your position at *B*, guide bearing 315 degrees relative, distance 2,700 yards. Draw the *relative movement line Bb*. Point *b* where this line intersects the turning line *TT* is the point to turn. Guide bears 285 degrees relative (15 degrees forward of port beam) distance 3,150 yards. You will end the turn on the track of the guide and about 3,800 yards astern.

Two-Course Maneuver Problems

A two-course maneuver is used where to perform the maneuver with a single change of course requires a change of more than 120 degrees. In other words, maneuvering to lose distance to the van and where the new position is to be approximately astern of the old position.

The method is illustrated in the following examples and shown in Fig. 4.

Course of guide is north, speed twelve knots. A ship on the starboard beam of the guide, distant 4,000 yards, is directed to take station 30 degrees abaft the starboard beam of the guide, distant 4,000 yards. What do?

The first decision to make is what courses shall you steer, first turning away from the guide and after running for a certain distance turning and running towards the guide, finally turning up in order to be steady on the base course and the ship in the required position.

Plot your present position *A*, guide bearing 270 degrees, distance 4,000 yards. Next plot where you are to go, *B*, guide bearing 300 degrees, distance 4,000 yards.

Suppose you decide to head out at 45 degrees to right of present course and then to turn 90 degrees left and head back in at 45 degrees to the left of present course. *The important decision to make is what course you shall steer as you return.*

Lay off your speed triangles. Guide's course 0 degrees, your course out 45 degrees, in 315 degrees, speed twelve knots (6 on half scale). Lay off the returning *relative movement line BN* parallel to CD. Your object is to execute the turn at such point that, when the turn is completed and you are steadied on the new course 315 degrees, your position will be somewhere on the line *BN*. Except for time to complete the maneuver, you do not care where you are just so you are on the line. Of course you must be far enough to the right of *B* that you will not overrun on your turn up on to the base course.

A ship executing a two-course maneuver of out 45 degrees, in 45 degrees, will lose over 550 yards distance if she executes each turn as soon as she completes the previous one. Therefore do not use a 45-45 maneuver unless your new position is to be well over 600 yards astern of present position. Similarly a 30-30 maneuver should not be used unless you have over 400 yards to lose.

Next lay off the going out *relative movement line AN* parallel to *CD*.

Previous articles on this subject state that the time to execute the turn is when you reach the point of intersection *N* of the two *relative movement lines*. This would be correct, provided the ship turned *instantaneously* to the new course and without loss of speed.

If the turn were not executed until arrival at point *N*, at the completion of the turn, the ship would be considerable distance beyond *BN* but would be proceeding along a *relative movement line* parallel to *BN* such as the line *yy* and hence would be far behind her proper position when she turned up on to the track of the guide.

Strictly speaking the track of the guide is the line indicating the course of the guide and passing through the position of the guide at the center of the mooring board.

In this article the meaning is broadened to any line parallel to the course of the guide and passing through the point "Where you want to go." At this latter point, the *relative movement* of the ship and guide is zero.

Line *BN* is, therefore, not a track of the guide line but a *relative movement line*.

For turning from one *relative movement line* to another, I have found the following "thumb" rule to be correct for capital ships:

Multiply the number of degrees of turn by six to give the distance in yards from

the second relative movement line at which to execute the turn.

Applying this rule to the above problem, we get as follows:

Number of degrees turn =90 (first course 45 degrees, second course 315 degrees) 90×6=540 yards. Lay off line *xx* parallel to, and 540 yards on the side of aproach from the second *relative movement line BN*. At the point where *xx* intersects the first *relative movement line AN*, execute the 90 degree turn. At the point of intersection of these lines, the guide bears 276½ degrees, distance 5,430 yards.

Through *B* draw a line parallel to the guide's course. This line is the track of the guide. As you have to turn 45 degrees back to the base course, lay off your turning line 45×10—100=350 yards from the track of the guide, and execute your turn back to the base course when the ship arrives at the point of intersection of the turning line and *BN*. Bearing of guide 296 degrees, distance 4,250 yards.

Take the case where the ship does not execute the turn until arrival at point *N*. After completion of the turn she will be somewhere on line *yy* parallel to, but 540 yards beyond the line *BN* where you wanted to be.

Suppose you get a plot as follows: Bearing of guide 288 degrees, distance 5,800 yards. What would you do? Point *f* is the plot. Join *fB* to give your desired *relative movement line*. From *C*, on your speed triangle, draw *CF* parallel to *fB*.

Line *CF* shows that with equal speeds, to reach *B*, the ship should steer a course 350 degrees, only 10 degrees to the left of the base course. This would require a long time to complete the maneuver.

You have steam for full speed, 13½ knots. What do? Your desired *relative movement line* is parallel to *CF* of the speed triangle. The intersection *F* of this line with the 13½ knot speed circle gives you the new course, 326 degrees. Therefore you would take up full speed and change course 11 degrees to the right. *Do not forget to relocate your turning up line.*

You may find on subsequent plotting that you are going to be astern of *B*. In this case, execute the turn at proper distance from the track of the guide and retain full speed until you regain position.

EXCESS SPEED

Capital ships will "coast" about 100 yards for each drop of one knot in speed, so due allowance must be made for this "coast." As you have 1½ knots excess speed over the guide, resume standard speed when you are 150 yards astern of your position *B*.

In case you are using excess speed, and your plot shows that you are going to turn into the track of the guide ahead of your desired position, proceed as follows:

From your plotted position draw the *relative movement line*, then from *B*, lay off the *relative movement line*, for equal speeds. Resume the speed of the guide before your plot shows you at the intersection of the "excess speed," "equal speed" *relative movement lines*. The proper distance from the equal speed line to resume guide's speed depends on your amount of excess speed and as given above is 100 yards for each knot excess speed.

Painting by Burnell Poole

Courtesy of Office of Naval Intelligence, Navy Department.

THE SIXTH BATTLE SQUADRON OF THE GRAND FLEET LEAVING THE FIRTH OF FORTH

The first of a series of paintings of the Navy's activities in the World War, being presented to the Naval Historical Foundation by the E. I. Du Pont de Nemours and Company for permanent exhibit at the U.S. Naval Academy. This picture was presented on April 6, 1928.

M. G. M. News Photo

THE BATTLE FLEET CLOSES TO "ENGAGE"

The Fleet about to start the most spectacular of its annual practices. See next page.

M. G. M. News Photo

THE BATTLE FLEET CLOSES TO "ENGAGE"

The Fleet about to start the most spectacular of its annual practices. See next page.

International Newsreel

THE BATTLE FLEET IN ACTION

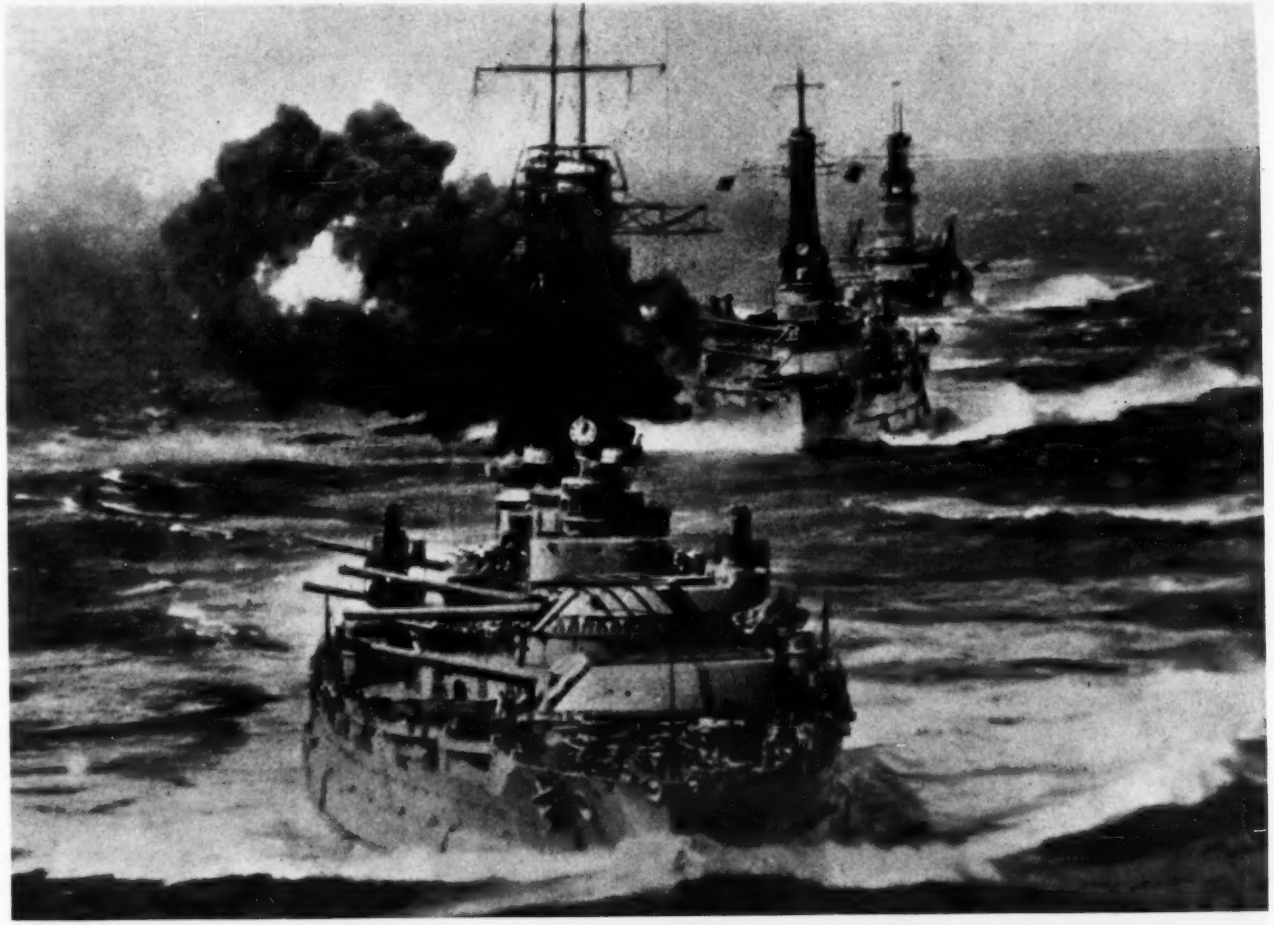
With big guns booming and the secondary battery barking, with torpedoes coming in flocks, this practice involves every element of battle but enemy gun-fire.

Navy Recruiting Bureau New York

"FORMATION OPEN ORDER"

Navy Recruiting Bureau New York

"FORMATION OPEN ORDER"



Underwood & Underwood

"THE DIVISION ENGAGES"

Navy Recruiting Bureau, New York

"FIELD DAY" AT SEA

Cleaning goes on in the midst of maneuvers for the first law of the Navy is cleanliness.

Navy Recruiting Bureau, New York

"FIELD DAY" AT SEA

Cleaning goes on in the midst of maneuvers for the first law of the Navy is cleanliness.

Navy Recruiting Bureau, New York

THE MASCOT'S "FIELD DAY"

"WHEN EVENING SETS HER LAMPS ALIGHT"
Battleships at anchor, San Pedro, California.

Courtesy of Captain Wat T. Cluverius, U.S.N.

DISCUSSIONS

"WHEN EVENING SETS HER LAMPS ALIGHT"
Battleships at anchor, San Pedro, California.
Courtesy of Captain Wat T. Cluverius, U.S.N.

Diesel Engines for Capital Ships

(See page 1217, July, 1925, PROCEEDINGS)

CAPTAIN A. M. PROCTOR, *U. S. Navy.*—An article under the foregoing heading was published in the July number of PROCEEDINGS for the year 1925.

The opinion was then expressed that the Diesel engine had reached a point in its development where it was possible to consider it seriously as a form of motive power for capital ships; and that it was practicable, recognizing certain inherent differences between commercial and naval types, to adopt the long stroke commercial type to naval needs, where a short stroke, high revolution engine is required. There has been little reaction, in naval circles, to that suggestion, or to the more specific recommendation later made through official channels.

During the succeeding two years, since the foregoing article was written, the development of the Diesel engine has been very rapid, and there is at present available data sufficient to justify the correctness of the opinion expressed in 1925.

There are available a number of marine engines, which, without introducing any very abstruse problems of design, could be adapted to naval purposes.

It is recognized, however, that there are certain difficulties in bringing this about, and that if this were the only course of procedure open, we would be as far from the Diesel engine ship now as we were two years ago.

The purpose in attempting to reopen this discussion after two years is to point out that, owing to the requirements of a service where the conditions are similar to those encountered in naval vessels, an engine is available for installation in any type of capital ship contemplated, or, for rehabilitating some of the older battleships which are now in the process of modernization.

The announcement has just been made authoritatively that, encouraged by the successful operation of the 15,000 B.H.P. engine installed in the power station at Hamburgh, the Berlin Electric Power Company have placed an order for two high speed, Augsburg solid injection engines, to develop 12,000 B.H.P. in ten cylinders. The cylinder diameter is given as 600 mm. (23.62 in.) and the stroke as 900 mm. (35.43 in).

The published information in regard to these engines would seem insufficient from which to draw conclusions as to their availability for naval purposes. In view, however, of the fact that very complete data has been published in regard to the double acting Augsburg engines, it is possible to give the general characteristics of these engines within close limits as follows:

No. cyls.	10
B. H. P. normal	12,000
Cyl. Diam.	23.62 in.
Stroke	35.43 in.
Ratio stroke bore	1.5
Wt. per cu. in. cyl. vol.	5.2 lbs.
Wt. total	800,000 lbs.
Wt. per B. H. P. normal	67 lbs.
B. H. P. overload	16,800
Wt. per B. H. P. overload	48 lbs.
Height from bottom of crank case	22 ft. 8 in.
Length	50 ft.

The overload power given above is based on the fact that Augsburg practice has been to rate engines conservatively as regards mean indicated pressure, and that trial results for Augsburg and other solid injection engines show an overload figure for mean indicated pressure of about 30 per cent. This will give an increase in revolutions of about 10 per cent, which will result in an overload power figure of 43 per cent.

There are two unknown factors: the

M.I.P. and the piston speed; but since the product of these is a constant, which can be computed from the other known factors, it is possible to give corresponding values for these factors and for the revolutions as follows:

Mean Ind. Press	*Piston Speed (2LN)*	*R.P.M.*
100 lbs. sq. in.	1,110 Ft. M.	188
90 lbs. sq. in.	1,233 Ft. M.	209
85 lbs. sq. in.	1,306 Ft. M.	221
80 lbs. sq. in.	1,387 Ft. M.	235

The Augsburg firm, while adopting a conservative rating for values of mean indicated pressure, has shown a progressive tendency in successive designs towards a higher piston speed. It is probable that a normal rating at 85 pounds M.I.P. and 1,300 feet piston speed is not far from the truth.

The question as to whether this engine, as built in ten-cylinder units, is available for capital ship requirements, depends, of course, upon what these requirements are, and it is possible that there would be some difference of opinion upon this point.

It is believed that the prevailing naval opinion would be in favor of a type in which gun power predominated. In a discussion of the treaty battleships, Sir George Thurston, in the 1923 number of *Brassey's Naval Annual*, has given the general characteristics of this type as follows:

Length	700 ft.
Beam	104 ft.
Draught with 1,000 tons fuel....	28 ft. 6 in.
Displacement (Treaty)	35,000 tons
S. H. P.	55,000
Speed	24 knots
Machinery wts.	2,150 tons

This engine in a four-shaft arrangement would give a normal full power of 48,000 B.H.P. and an overload full power of 67,000 B.H.P.

The total engine weight would be 1,600 tons, which would leave 550 tons available for auxiliary machinery.

The length of the engines would be materially less than half of available machinery space, and, with the height available in present type battleships, there would be more than four feet clearance over the cylinder heads.

This engine at present represents the largest power unit built or building with solid injection. It is quite certain that before the time arrives for considering a treaty battleship, larger power units will be available since the cylinder area is about one-half of areas at present available in air injection engines.

In the meanwhile this engine, as it stands, is available in six-cylinder units with a four-shaft arrangement, for powers up to 40,000 S.H.P., which would make it possible to really modernize some of our older battleships.

A Destroyer Leader for the U. S. Fleet

John Dahlgren Wilson, *S.M.1st.C., U. S. Navy*

Since there has already been so much discussion regarding that vitally needed type vessel in the United States Navy, the destroyer leader, the writer has accumulated the paramount features of the various designs and collaborated them in one vessel for the criticism of that eminent body of men, the readers of the U. S. Naval Institute Proceedings.

In our design I have gone to some detail to insure a uniformity and simplicity that will not only prove valid on paper but would, it is hoped, attain a high degree of efficiency.

Comparisons. Captain Taussig, in his extremely effective discussion, prefers the flush deck type, mounting twin 6-inch guns fore and aft, a moderate number of torpedoes, a small tripod mast forward housing the director controls, and a rather small anti-aircraft battery.

Captain Dinger prefers a smaller type but with the 6-inch as main weapon also.

Mr. Prendergast is decidedly in favor of a rather radical design far different from the traditional type of war vessel so familiar to our constructors and resembling, in silhouette, the Spanish *Principe Alfonso* cruiser class.

Mr. Livingston states that the ideal leader should offer a very poor target, have a powerful battery of twin 6-inch guns in two pairs, and abundance of torpedoes and at least six anti-aircraft guns.

It would be an impossibility to crowd a small hull with all the above mentioned features and so in order to conform with the dimensions and tonnage allowed us, we will have to choose the most desirable and not overcrowd our ship with a large amount of unnecessary and surplus gear.

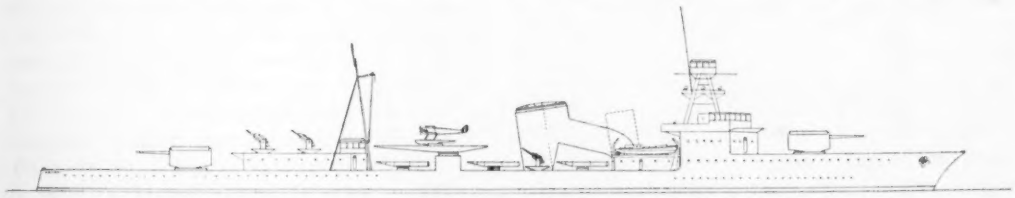
Nom de Plume. In order to avoid calling the design I have submitted "mine" (It is the collaboration of ideas of several ex-

perienced men) we will christen her the *Honda* and go on with the details.

Design of Hull. It is mutually agreed that a dry ship control is most desirable and it has been said that a heavy mount fore and aft has a marked tendency to cause a ship to pitch badly in head seas.

The writer has observed the Japanese "Destroyer Scout" *Yubari,* with three heavy 5.5-inch guns fore and aft, in a very heavy head sea off the coast of Honshu, and though the ship the writer was on was only making from eight to ten knots and taking every wave high over the bridge, the *Yubari* drew ahead rapidly and took very few waves over her guns.

The *Honda's* bridge is not quite as high as the *Yubari's* but nevertheless, the dampness experienced would be infinitesimal. It is also designed to accommodate not only the ship's personnel but the squadron commander with his staff, etc. With the comdesron on the bridge, it brings him in actual contact with the ship's captain and navigating officer, insuring perfect control.



In the original *Honda* draft, two funnels were used but as the forward one was too near the bridge, the present design of trunking the two uptakes into one, was adopted, and if such a rig is objectionable to the eyes of many of our critics, the original funnels are drafted in dotted lines to show their former place.

Armament. The main battery chosen for the *Honda* is Captain Taussig's original design and from experiences derived from the 7,500-ton *Omaha* class, the 6-inch fifty-three caliber gun is very powerful, accurate and hard-hitting. With two guns on the bow and two on the stern, giving a broadside of four guns, this battery is infinitely more powerful than that of any existing destroyer leader in commission, building, or even proposed, and the *Honda* could handle many large cruisers very roughly, trusting on superior speed to keep the range open.

Mr. Livingston's six anti-aircraft guns suggestion has been taken and the *Honda* has four 3-inch fifty caliber anti-aircraft guns mounted on the after deck house, which, by the way, contains the necessary artificer shops and aircraft work room, and one on each side of the second uptake.

Torpedo Armament. A torpedo battery of eighteen torpedo tubes in six triple mountings, three on each side, has been adopted and since Mr. Prendergast has so greatly insisted on a few short range, cold shot torpedoes, the two forward sets of twenty-one-inch tubes can be replaced by the eighteen-inch close action tubes. All tubes are the same distance apart, are in a position where torpedoes hoisted aboard can be replaced in their tubes without moving them all over the deck, and they are out of the way of engine room hatches, blowers, etc.

Airplane Catapult and Equipment. Each writer has included one or two seaplanes in his design of the ideal leader. On the *Honda* a light but strongly constructed platform has been built from side to side and a small and lightly constructed catapult has been placed upon it, amidships, in such a position as to avoid hitting torpedo personnel and within easy access of the hoisting boom.

Since aircraft carriers carry the brunt of the burden in regards to scouting, bombing, etc., and all large ships carry several planes, I think that a small plane of the type used on the submarine *S-1,* with only a single pontoon, would be efficient in fulfilling its duties for a destroyer leader. It would be on rare occasions that the *Honda* would leave her consorts due to screening duties and even though she could do without aircraft equipment, in order to produce a leader in conformity with everybody's ideas, such an equipment as observed on the *Honda* would be light, convenient for hoisting aboard, etc., and would be well out of the way whether the plane were aboard or not.

For efficient handling purposes, I have placed a light tripod mast aft with the boom

tackle clear of all guys (no guys are needed with such a tripod).

Engineering. Giving due regard to an efficiently laid out engineering plant, the writer has to state that his knowledge of that subject is not up to par, but if we give the *Honda* a length of about 410 feet with a beam of forty-five feet and displacing between 2500 to 3000 tons, five or possibly six small tube boilers of 9000 square feet heating surface each, would give sufficient horse power—about 50,000, and, with the fine lines and light tonnage, would drive the *Honda* at about thirty-five or thirty-six knots.

It is recommended that the ship's electrical supply be generated by Diesel-driven generators. The writer was on the U.S.S. *Noa* when one of her turbo-generators blew up with the disastrous result of four men killed. Such an accident could be avoided by the use of Diesel-driven generators.

Searchlights. Some writers desire the searchlights away from the bridge because at night they give away the most vital spot, the control. If so desired they can be placed on each side of the uptake or on a platform on the forward tripod.

Visual Communications. In view of the fact that signal flags and the glare from signal searchlights may interfere with the squadron commander, it is probably best that the visual communications equipment remain forward in touch with him.

Rig. A light and sturdy tripod is mounted forward, housing the director control house on top and the searchlight platform about half way up between the bridge and director tower.

The tripod aft has been discussed before as being amply solid enough for the airplane boom gear without stays forward which would interfere with efficient handling of the catapult and boom.

Summary. The *Honda* is taken as a whole more on the basis of a traditional type man-of-war and her paramount features are tried and true United States naval equipment which has brought credit upon the designers. It would be folly to adopt a single feature from a foreign nation without proof of its effectiveness or to indulge in freak ships. The leader's life is not long enough to warrant the expense in building types that are unknown and only perfected after many years' service. The material in use today in our Navy would be the most sensible equipment to use on a new type ship and in our present economical age, would, without question, prove most efficient.

Notes on the Measurement of Fuel Oil

(See page 2286, November, 1926, PROCEEDINGS)

NEIL B. MUSSER—Lieutenant Gambrill states that the results obtained by using the formulæ (curve) given in the Engineering Instructions (Manual) are the same as those obtained using the tables given in Bureau of Standards Circular No. 154, for *small* quantities of oil, but are different for large quantities. The fact is that the Navy formulæ and curves are identical with those used by the Bureau of Standards for all oils of specific gravities under 34.9° A.P.I. (34.6° Baumé), or, in other words, for all commercial fuel and diesel oils, and for most crude oils. For gasoline and similar light distillates, the coefficient of volumetric expansion of .0004 used in the Navy formulæ and curve is too small. I would suggest making a slight alteration to formula (1) of the above article, and adding the table given in the supplement to Bureau of Standards Circular No. 154, issued October 8, 1925. The revised formula will then apply with exactness to all qualities, and, of course, to all *quantities* of petroleum and its products: (1) $A^1 = A - KA\ (t - 60)$

Where A = Gals. of oil in tank at t°F. obtained by soundings or ullages.

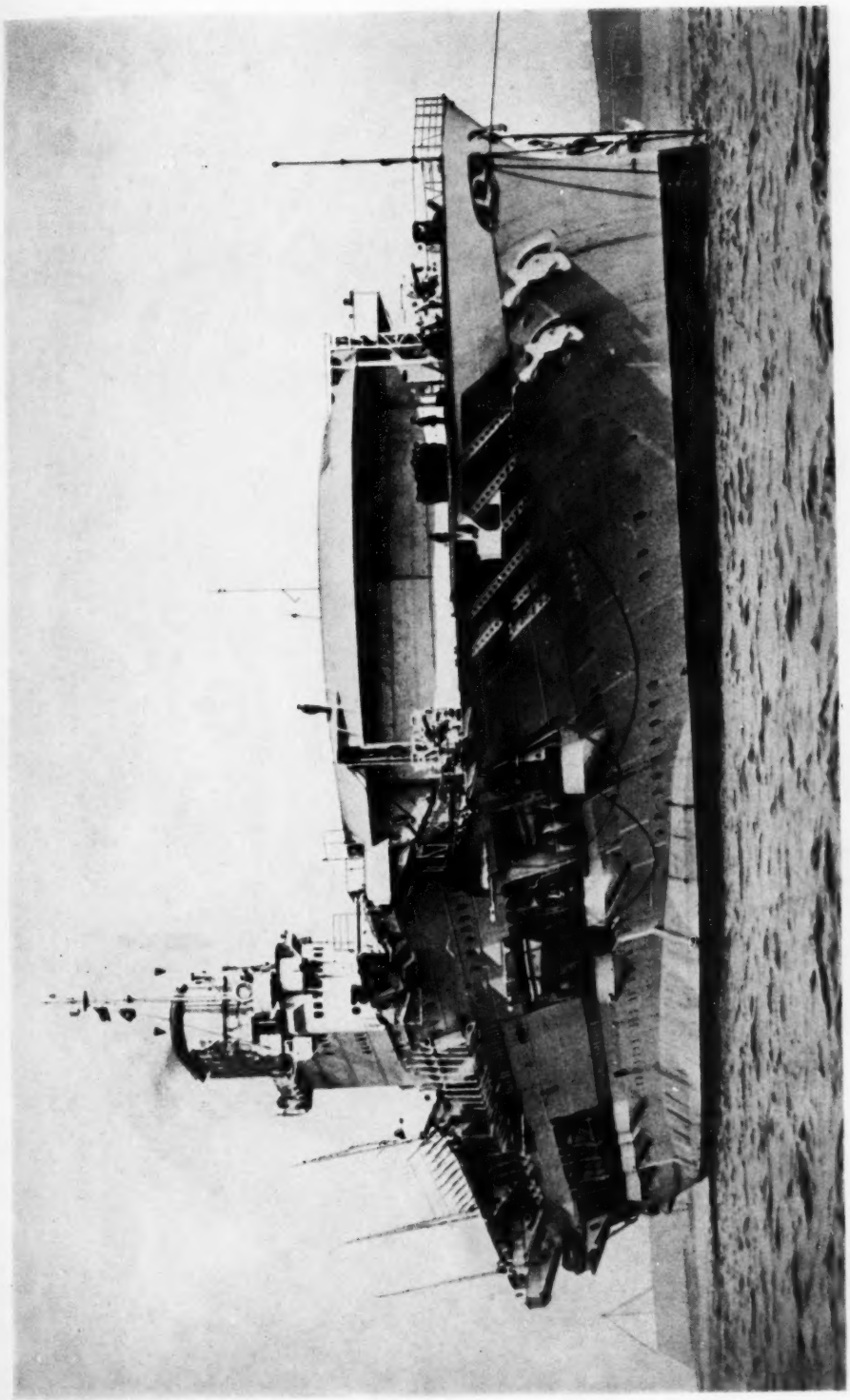
A^1 = corresponding volume of oil referred to 60°F.

t = average temperature of oil at time ullages were taken.

K = coefficient of volumetric expansion of oil at 60°F. obtained from the following table:

Specific Gravity, Degrees *A.P.I.* at 60°F.	K
0 to 34.9	.0004
35 to 50.9	.0005
51 to 63.9	.0006
64 to 78.9	.0007
79 to 88.9	.0008
89 and over	.00085

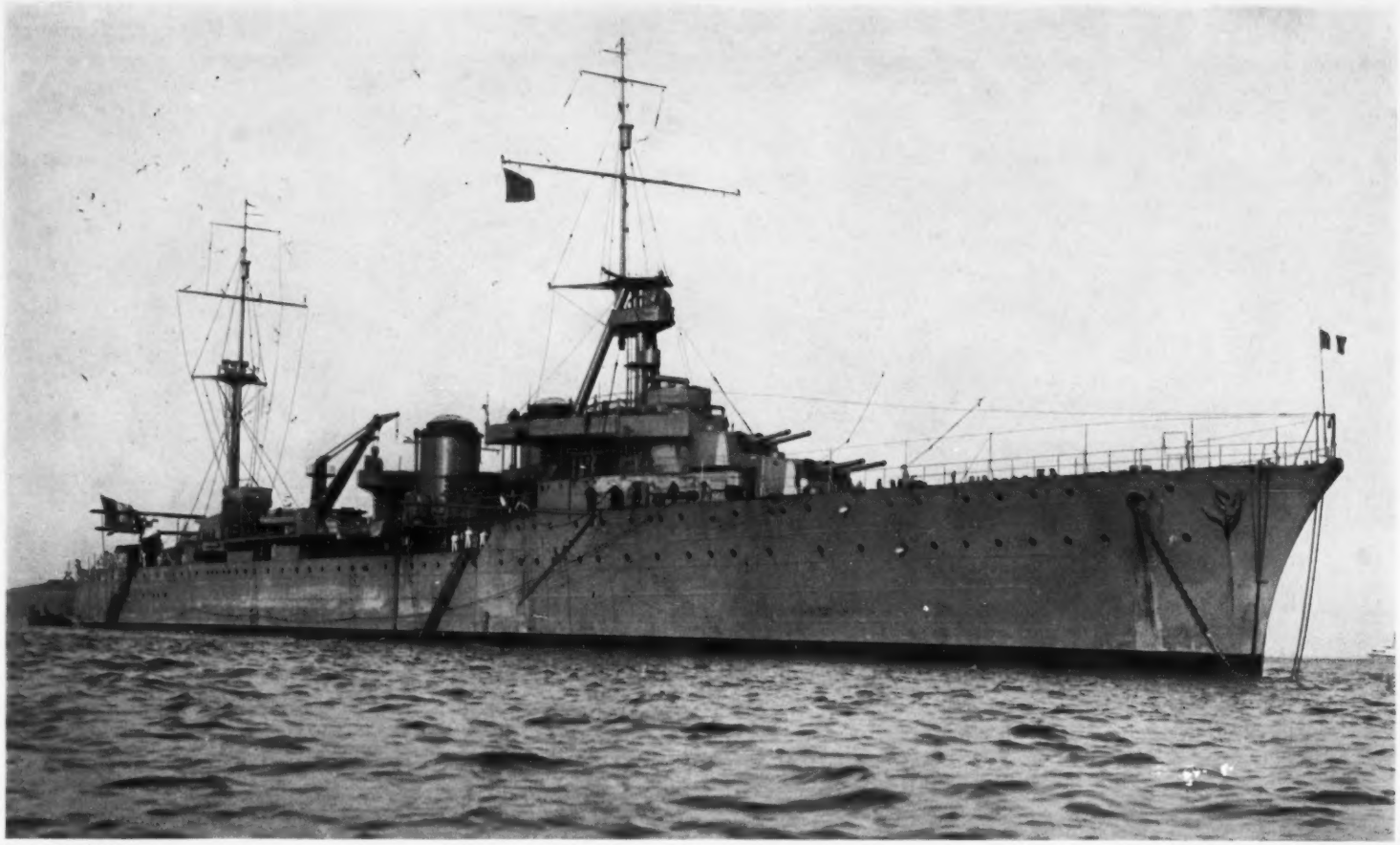
A negligible error inherent in the use of either the above formula or the Bureau of Standard's tables, is caused by the effect of the buoyancy of the air on the observed gravity readings.



H. M. AIRCRAFT CARRIER *COURAGEOUS*

As she appeared just before leaving Devonport for first trials since conversion from a light battle cruiser.

International Newsreel



International Newsreel

NEW FRENCH CRUISER *PRIMAGUET*
Recently touched at San Francisco on a round-the-world cruise.

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PROFESSIONAL NOTES

4 March to 31 March

Compiled by
Commander F. W. Rockwell, U. S. Navy,
Lieutenant Commander A. C. McFall, U. S. Navy,
and
Assistant Professor Henry Bluestone, U. S. Naval Academy

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NEW FRENCH CRUISER *PRIMAGUET*
Recently touched at San Francisco on a round-the-world cruise.

International Newsreel

GREAT BRITAIN

Glorified Destroyers and The Big Submarine

Naval and Military Record, March 7.—There was recently launched at the Maizuru works for the Japanese Navy a destroyer which, it is claimed, is the largest vessel of this designation in the world. Officially known as *No. 35,* her displacement is given as 1,700 tons and her length as 300 feet. Her speed is estimated at 34 knots. Although classified as a destroyer, the probability is that she is designed to act as a flotilla leader. Still, the Japanese favor very big destroyers, presumably on the assumption that these would have to go long distances in the event of war. The fact is the definition of the destroyer has become a little confusing nowadays. In our own service vessels of this category have increased in size by three-fold during the past quarter of a century, whilst the introduction of the leader has added a new type of unit to the class. The destroyer made her appearance in response to the growth of the torpedo boat, which she was intended to chase and destroy, whilst herself being equipped to carry out the functions for which the smaller craft was intended. In those days the torpedo was a weapon with a range of less than 1,000 yards, and used only by torpedo boats or steam pinnaces fitted with dropping gear.

Now that the cruiser, with a speed equal to that of the destroyer, is actually fitted with more torpedo tubes than the destroyer, it would appear as though there was an overlapping of functions. The flotilla leader, indeed, is virtually a light cruiser and, owing to her high speed, is well adapted to scouting duties. The vastly-increased range of the torpedo naturally has influenced the whole question of destroyer tactics. The advent of the submarine brought a new task to the destroyer—that of protecting big ships against underwater attack. Her growth is directly attributable to the necessity for her presence with the battle fleet, and the additional tonnage is devoted more to increased fuel endurance than to anything else. In the British Navy an average displacement of rather under 1,000 tons for the destroyer and somewhere about 1,800 tons for the flotilla leader seems to have become the settled standard. The ocean-going destroyer does not appear to appeal to the British Admiralty, probably for the reason that the light cruiser really fills this function, and that an ocean-going destroyer to fulfill its designation would have to be as big as a light cruiser in any case. For attacking purposes in a fleet action the smaller the destroyer the better, so long as she retains the maximum of speed.

Closely related to this question of the growth of the destroyer is the increase of the submarine, since both are primarily designed as torpedo craft. But there is this distinction to be drawn, that, whereas the destroyer is intended to act as a flotilla unit, the big submarine is designed for independent action. That this is the Admiralty view is pretty well demonstrated by the fact that the *X-1* and *K-26,* the two biggest submarines in the Navy, were recently detached from the Mediterranean flotilla to which they belonged and constituted independent commands. The Baltimore *Sun* lately announced that "France has laid the keel of the greatest of all submarines, a monster underwater cruiser. It will be 1,000 tons larger than the *V-4,* which made the United States lord of the depths. The new French submarine will be a 3,000-tonner, a warship which can stay on the surface and match strength with any cruiser or ship." We are sorry to have to cool the patriotic ardor of the Baltimore journalist by cold facts, but the *V-4* has never been lord of the depths if this modest claim rests on size. The British *K* class, built during the war, are bigger than she is, and *X-1* is probably at least as big as the projected French vessel.

The statement that a submarine cruiser can lie on the surface "and match strength with any cruiser or ship" shows a very sketchy idea of the facts. The submarine, acting as a surface ship, is no match for the *pukka* surface ship of even corresponding size and armament. A very few hits would serve to do her business, and in tactical maneuvering she is at a serious disability. But there may well be a very valuable rôle for the submarine cruiser to fill both in commerce protection and commerce destruction. She has a very wide radius of action, and can economize fuel in a way which the surface ship has no opportunity to do. The principal drawback to the very big submarine is the discomfort in which her crew has to live, particularly in hot weather latitudes. Her interior is necessarily so much bottled up as to rend ade-

quate ventilation extremely difficult, and the deck of a submarine is not altogether ideal for sleeping purposes even under favorable conditions—which wartime does not often bring. As a fleet unit the big submarine is of little relative value, but there might be many opportunities for her independent employment in the course of a war.

FRANCE

French Submarine Policy

Naval and Military Record, February 15.—The growing perplexity in this country at the policy of France in building such a vast armada of submarines is finding a repercussion across the Channel in the form of protests that this policy is not aimed against England. It is pointed out in support of this contention that the great bulk of the French submarines are stationed in the Mediterranean. This, of course, means nothing. The immediate distribution of a country's naval forces need not furnish any indication to the objective, hypothetical or positive, of those forces. We confess to more curiosity than concern regarding French naval policy at the present time. Our "hereditary enemy," like ourselves, has more than ever come to the conclusion that war does not pay. Her statesman say that all she aims at is "security." Yes, but security against whom? If she regards the Locarno Treaty as worth the paper it is written upon, then she has no occasion to worry about Germany's "designs." Moreover, Germany is practically impotent as a sea power for long years to come. The only naval powers which France can seriously regard in Europe today are Great Britain and Italy.

Logically, the big submarine program is a reasonable corollary to the big aircraft program. France has renounced the position she formerly held in the list of the world's sea powers. Her attitude is that she is satisfied to maintain adequate defensive forces. Her great strength in submarines and aircraft should render her shores fairly immune from attack or attempt at close blockade in the event of war. But they are of very small value in guarding her ocean commerce and her big colonial possessions. For this reason we are prepared to believe that her policy does not contemplate the possibility of conflict with this country. Probably if the truth were told France has no definite objective at the present time. At the end of the war she found herself the premier power of the world in air strength, and she has maintained that position ever since. That she should adjust her naval plans to her air position is but natural. After all, she is simply reverting to the principles of the *jeune école.* A submarine fleet can only be regarded as an aggressive fleet in the event of war designs upon a very near neighbor. Since it would be merely ridiculous to assume that France harbors any such designs against Great Britain, and since there is no visible reason why she should quarrel with Italy, it would seem as though her plea of "security" is a perfectly sincere explanation of her purpose, even although our question "against whom" remains unanswered.

French Naval Developments

The Engineer, February 17.—The French naval authorities are extremely gratified by the trials of the new cruiser *Tourville.* This 10,000-ton vessel, which was built at Lorient Dockyard and engined partly by the Ateliers et Chantiers de Bretagne and partly by the State factory at Indret, was launched in August, 1926. She has Rateau geared turbines of 130,000 S.H.P., taking steam from nine Guyot boilers, the contract speed being 34 knots. On her preliminary runs she attained a mean speed of 34.13 knots, with an output of only 105,000 S.H.P. Although the ship was in light condition at the time, her main armament not being on board, it is anticipated that at full load she will be able to reach her designed speed with ease. The success of these trials is a further tribute to the type of boiler which has been adopted by the French Navy since the war, and which had already given excellent results in the three 8,000-ton cruisers of the *Duguay-Trouin* class. Details have now been released of the submarine *Redoubtable,* which is to be launched at Cherbourg on February 24, after being over two and a half years on the stocks. She was designed in the first instance as a submersible cruiser, but the plans apparently were modified, and she is now rated as a *sous-marin de grande patrouille.* The design is considered to be so satisfactory that twenty-nine similar vessels are now under construction or projected. The *Redoubtable* is 92 m. in length, 8.16 m. in breadth, and displaces 1,560 tons on the surface and 2,080 tons when submerged. Diesel engines of 6,000 B.H.P. are

installed, the contract surface speed being 18.5 knots. The equipment is reported to include a small folding seaplane.

GERMANY

New German Cruisers

Naval and Military Record, February 22.—The two new German cruisers *Karlsruhe* and *Konisberg* are interesting ships in more directions than the unquestionable efficiency of their design. They may be described as seamless vessels, since the hull plating has been joined up by electrical welding. We shall need to learn more about the results of this process under the test of experience before being converted to faith in it. The German shipbuilders claim that it expedites the rate of construction, which is no doubt true, and that it saves weight in rivets, which is negligible since a rivet only replaces drilled-out metal. How far welded plates are going to stand the stress of heavy laboring in a seaway can only be ascertained by experience, and the process has a tendency to weaken the metal. Moreover, in the event of repairs being necessary there will be more difficulty in dealing with seamless plating than with riveted joints. Probably the German naval authorities regard these two new cruisers as an experiment in construction which was worth making since, if it proves completely successful in practice, it will both expedite and cheapen the cost of warship production.

Upon their displacement of 6,000 tons apiece, these new German cruisers are remarkable vessels. They are equipped with geared turbines of 65,000 S.H.P., estimated to give them a speed of 32 knots. Only six boilers are fitted, so as to economize weight to the utmost, and these are of the small tube type, to work at very high pressure. As a consequence oil fuel is economized without corresponding sacrifice of radius of action. Diesel engines are fitted for economic cruising speed, giving the cruisers an endurance of 6,000 miles at about 10 knots without using their steam at all. The armament is nine 5.9 guns in triple turrets, one forward and one aft. These latter are not centerlined, but placed *en echelon,* an arrangement which is claimed to yield better protection.

As far as can be learned—for on this point the German naval authorities are not disposed to be very communicative—only two torpedo tubes are fitted, but a large number of mines and dropping gear are carried. Armor protection is sparse and light. The general details suggest that these cruisers have been designed more particularly for commerce raiding, since they have exceptionally wide sea-keeping qualities for their size. In gun power they will be considerably inferior to our new *B* class cruisers. But the Germans evidently retain their faith in moderate calibers and high velocities. They believe that fire intensity counts for even more than superior weight of projectiles, always, of course, assuming effectiveness of range to be maintained.

The Naval Budget

Le Yacht, March 10.—The German naval budget for 1928 has given rise to much comment abroad and even in Germany. It totals 210 million marks instead of 162 in 1927. But about one half of these appropriations can be shifted from one item to another, and this offers particular facilities to the Minister of the Navy for more or less secret armament combinations.

The General Staff has not less than seventeen sections. There are four autonomous inspecting organizations, one administration of proving grounds, fourteen subdivisions for the only navy yard and the only shipyard, two commissaries with thirty-one sub-divisions. The German Navy is organized as if it were to resume the same importance as before the war.

But, in addition, they inflate in an extraordinary fashion the prices of new construction. For a ship of 10,000 tons which would cost 150 million in France, they ask 80 million marks, that is to say, 485 million francs. The artillery of the cruiser *Karlsruhe* (nine guns of 150 and three of 88 mm.) cost 14½ million marks or 85 million francs, while the real price of such guns is not more than 20 million. The rest is at their pleasure. It is at least probable that a large part of these inflated appropriations are intended for the construction of artillery for the Army, in addition to the guns provided for in the Treaty of Versailles.

New Hull Shapes ("Maier")

La Revue Maritime, January, 1928.—At the "Schiffbau-Versuchsanstalt" (Shipbuilding testing station), Hamburg, trials were made on September 6, 1927, by the Deutsche

Schiff-und-Maschinenbau A.G.," of the new construction system known as the "Maïer Forms."

The Maïer forms which have not yet been applied in practice were perfected theoretically twenty years ago by Maïer, an engineer of Vienna. They differ in the first place from the forms generally used in that the fore and after frames of the ship are such that the center of gravity of the half surfaces of the frames is located on as limited a curve as possible. The consequence is that, as verified during the trials mentioned above, the water comes in contact with the sides of the ship by the shortest path. This shortening, which for ships of normal dimensions amounts to 10 per cent, results in the reduction of friction and, in addition, in the reduction in the importance of the eddies formed in consequence of resistance. The resistance at the bow is likewise diminished, because the fore frames, triangular in shape, are under the water; the bow does not cut the water like stems heretofore used, but attacks the water in a different fashion.

Due to the mere adoption of the Maïer forms, the economy effected in power on the different classes of ships is stated to be as follows: steam trawlers, nineteen per cent; small fast passenger steamers, twenty-five per cent; small steam freighters, sixteen and one third per cent; large, fifteen and one half per cent; large fast, eleven to fifteen per cent.

The "Deutsche Schiff-und-Maschinenbau A.G." has the exclusive patent rights for the construction of ships with these forms in Germany.

MERCHANT MARINE

Plans to Meet Foreign Competition

Marine Journal, March 15.—The Shipping Board has submitted to Congress one of the most searching and comprehensive reports ever prepared, showing that American flag ships face the dire prospect of being driven from the seas unless a definite program providing for replacements and operating stability is passed by Congress at this session. The report is based upon the splendid research work conducted by the Bureau of Research of the Shipping Board, of which Alfred H. Haag is head and covers the entire field of ship operation and management with thoroughness and decision.

Seven imperative needs are listed as essential for the permanent establishment of an American Merchant Marine and the preservation of the trade routes already placed under private control by the Board.

Before listing these minimum requirements, the document says: "To serve the best interests of the people the American Merchant Marine should be adequate in tonnage, of the most up-to-date type, second to none in speed and readily convertible for use in national defense. American shippers would find it more advantageous to employ the services of such a merchant marine, and it would satisfy best the nation's foreign trade and defense requirements."

The essential specifications listed in the report are as follows:

1. To insure permanency of service the construction, maintenance and operation of the American Merchant Marine should be liberally provided in advance for a period of ten years.

2. The American Merchant Marine, to be dependable, should be comprised of regular services operated on specified trade routes with sailing schedules at least as frequent as competition may require, or more frequent in the event that our foreign trade could be more advantageously developed.

3. In speed the American Merchant Marine should be able to deliver to the shippers of the United States a more rapid service on every trade route than would be made available by foreign shipping competitors.

4. The tonnage of the American Merchant Marine, to be adequate to carry the major portion of the waterborne foreign cargo tonnage of the United States as specified in the Merchant Marine Act of 1920, should have a considerably larger crop capacity.

5. To be satisfactory in design for the carriage of foreign trade, the American Merchant Marine should include vessels on every trade route with special facilities, wherever necessary, for the transportation of perishable and other cargo to be carried.

6. In meeting shipping crises, and because of the seasonal movement in the export trade of heavy tonnage of raw materials produced in the United States, such as wheat and cotton, and in the import trade of such products as coffee and sugar, the American Merchant Marine, to serve well the interests of producers and consumers of the United States, should maintain and oper-

ate a reserve tramp fleet in addition to maintaining services on specified trade routes.

7. As an effective arm of national defense, the American Merchant Marine should be comprised of vessels properly designed for conversion into light cruisers and to perform other specialized services, such as a convoy to the Navy, and as the overseas branch of the Army transport.

Statistics Concerning American Foreign Trade

Bureau of Research, U. S. Shipping Board.—The value of statistical research as an essential factor in industrial development has received general recognition at only a comparatively recent date. Formerly "experience" was the sole arbiter of policies governing the expansion of prospering concerns, as well as remedies for unfavorable financial conditions. This so-called "experience," in reality, consisted of impressions based upon personal recollections regarding transactions observed. Modern "experience" includes a capacity to comprehend and apply indisputable facts made permanently available by statistical research. This institution stands forth as a vital contributing factor in the development of our greatest industrial organizations.

Prior to 1921, there was no information available regarding transportation of the water-borne foreign commerce of the United States. In that year the United States Shipping Board instituted a system of recording all essential details relative to the physical operations incident to the transportation by water of the commodities involved in the foreign commerce of the United States.

Compilations from these records include comprehensive presentations of definite information regarding the movement of cargoes and carriers, foreign and domestic ports of origin and destination, and other facts not obtainable from any source existing prior to 1921.

Statements prepared from these records include:

That more than 5,760 ships, of 26,000,000 gross tons, are employed in the transportation of the foreign commerce of the United States, each of these ships making an average of five round voyages per annum.

Less than one-third of the 5,760 ships so employed are American-flag vessels.

The vessels of more than thirty foreign nations participate in the transportation of United States foreign trade. British-flag vessels far outnumber the American ships in that trade. It is also noted that British ships carry more cargo tonnage in the foreign trade of the United States than is carried by American ships.

Foreign-flag vessels, numbering 4,085, of 19,000,000 gross tons, carry more than sixty-six per cent of our entire foreign trade. More than twenty per cent of these vessels have been built since 1921.

American-flag vessels, numbering 1,675, of 7,000,000 gross tons, carry less than thirty-four per cent of our entire foreign trade. Less than four per cent of these vessels have been built since 1921.

Vessel entrances and clearances in our foreign trade exceed 58,000 per annum.

More than thirty per cent of the vessels coming into United States ports arrive in ballast, and more than twenty-five per cent of those leaving our ports depart in ballast.

Our water-borne foreign commerce involves the transportation annually of more than 113,000,000 long tons of freight, valued at nearly $8,000,000,000.

The freight bill for carrying this commerce is approximately $730,000,000.

The "overseas" trade of the United States includes commerce with all foreign nations other than Canada and the countries bordering the Gulf of Mexico and Caribbean Sea, i.e., Mexico, Central America, West Indies, and the North coast of South America to and including the Guianas.

In the overseas trade, which constitutes nearly sixty-two per cent in tonnage volume and eighty per cent in value of our entire water-borne foreign commerce, American-flag vessels carry less than thirty per cent of the import cargo tonnage and less than nineteen per cent of the export cargo tonnage.

The average value of overseas imports is $182.55 per ton, and the average value of overseas exports is $66.20 per ton.

The "nearby" ocean trade of the United States includes commerce with Canada, Mexico, Central America, West Indies, and north coast of South America to and including the Guianas.

In the "nearby" ocean trade, which constitutes more than twenty-six per cent in tonnage volume of our entire water-borne foreign commerce, American vessels carry approximately fifty-six per cent of the import cargo tonnage and fifty-two per cent of the export cargo tonnage.

The Great Lakes trade with Canada includes cargo tonnage amounting to more than eleven per cent of our total water-borne foreign commerce, and American vessels carry two-thirds of the import cargo, but only forty per cent of the export cargo in the Great Lakes foreign trade.

The average value of "nearby" imports, including Great Lakes trade, is $26.12 per ton, and the average value of exports is $37.44 per ton.

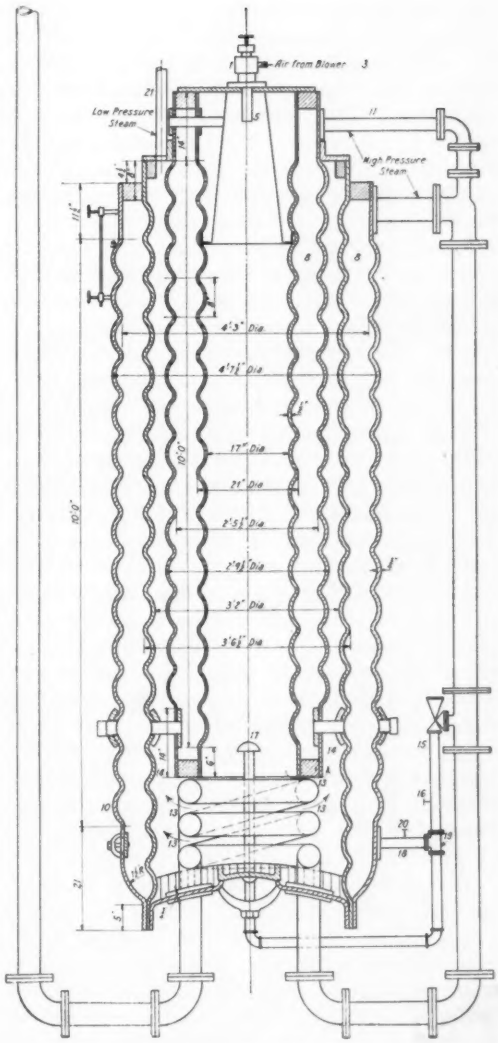
ENGINEERING AND RADIO

An Internal Combustion Boiler

Marine Journal, March 1.—Within recent years we have all become familiar with the internal combustion engine, but here we have an entirely new departure from usual engineering practice—a practicable and highly efficient internal combustion boiler that has worked well under demonstration. This boiler, which is now undergoing final tests at a Brooklyn ship repair yard, is so constructed that combustion takes place entirely inside of the boiler in direct contact with the steam, and it appears that by this method the well known advantages of the steam engine have been combined with the equally important advantages of the internal combustion engine.

Reference to the detail drawing of the boiler which accompanies this article, discloses the fact that there is no smokestack—a time-honored accessory of all boilers—which, in this particular case, has been entirely dispensed with. Another important feature of the new internal combustion boiler is the remarkably small space into which an efficient unit capable of producing great power can be installed. But we hasten to describe this latest development in boiler design in more detail.

In the internal combustion engine there is very complete combustion, due to the fact that the combustible mixture is first compressed before it is ignited. This new boiler also burns fuel under compression, though, while in the Diesel engine the combustion gases expand in the cylinder and furnish the actual motive force; in the new boiler these gases also pass through the cylinder together with steam—and the combined expansion of steam and combustion gases drives the engine. Unlike the Diesel engine, however, the cylinders are not cooled by external water jackets—a method which permits much unavoidable loss of heat—but under the new method the combustion gases are cooled by water atomized by steam, and every heat unit passes through the engine.



SCHWARTZ INTERNAL COMBUSTION BOILER

In the Diesel engine the exhaust gases carry off a great deal of heat—flames sometimes actually leaving the exhaust; whereas, in this new boiler arrangement, a part of the heat having been transferred from the gases to the steam and an average normal steam pressure having been established, gases and steam leave the engine at a very low temperature. The heat transfer in the new boiler takes place partially in the same manner as it does in the conventional type of boiler—fifty to seventy-five per cent of

the heat being transferred to the water for the production of ordinary steam, which in the triple expansion engine, for example, is used in the high pressure and intermediate cylinders. The low pressure cylinder receives the mixture of steam and gas. In a single cylinder engine both steam and gas can be passed through one cylinder and any number of combinations can be made. For example, the exhaust of an intermediate cylinder can be passed through the combustion chamber together with the combustion gases and then enter the low pressure cylinder. Steam from any boiler can be passed through this new device and can be superheated to any desired degree.

The accompanying diagram illustrates a vertical type boiler. An oil burner (1) is supplied by means of an exhauster (2) with air from the pressure blower (3) at, say, 20 pounds pressure. The air enters the combustion chamber through the Venturi tube (5)—oil entering at the same time through the port (6). This oil also enters at a pressure of 20 pounds. The mixture is ignited by the spark plug (7), or by any other suitable means. Steam is generated in the jackets (8), which are filled with water to a level indicated by (9) through the feed water supply line (10). This steam leaves through pipe lines (11) and goes through an engine unit by way of the continuation of pipe line (11).

The combustion gases continue through the port openings (13) into the outer jacket (14). Just before the combustion gases leave through the port openings (13), another portion of steam from pipe line (11) is supplied to pipe line (15), controlled by the valve (16) and reflected by the umbrella (17). This steam is mixed with the combustion gases.

In order to control the temperature of these gases and in order that the heat may be fully utilized, a water line (18), coming from a suitable source of preheated water, is connected to the injector (19) and controlled by valve (20). By means of this valve the operator may control the steam temperature in accordance with the requirements. This steam gas mixture leaves the outer jacket through line (21) and may go directly to an engine unit or be used for other duty.

The advantages of this steam generator, particularly for marine use, appear to be numerous. The boiler weighs less than a tenth of the ordinary boiler of equal capacity. It occupies only a fraction of the space, and operates a steam engine with Diesel engine economy. It can be installed in connection with any type of steam engine or turbine, and last, but by no means least, the boiler has no smokestack and all fire hazard in connection with its use is entirely absent.

Under this system, a 1,000 H.P. boiler weighs three tons as against sixty tons, estimated as the average weight of a Scotch marine boiler of equal power. It is estimated, therefore, that the cost of installation of such a boiler will be from one-fourth to one-third that of a boiler of the conventional type.

Summarizing the outstanding features of this new boiler, it appears to have all the advantages of the Diesel engine without many of the disadvantages. It also provides steam engine efficiency with Diesel engine economy. The summation shows that there is a total absence of vibration, no smokestack or exhaust losses, large economy of space as compared with the conventional boiler, and absolutely no fire hazard. In addition, there are other favorable factors, such as elimination of labor, automatic control, reduced weight, low first cost of installation, low cost of operation, and reduced cost of upkeep. All of these important points are claimed for the device by its inventor and sponsor, who also states that the boiler may be used on either reciprocating engines or turbines.

Marine Test of Mercury Boiler

Marine Journal, March 1.—As we go to press we hear that the mercury boiler is to be given a complete and exhaustive trial under seagoing conditions by the Sun Shipbuilding Company of Chester, Pennsylvania.

A 13,000-ton ship is to be fitted with turbo-electric drive, the fundamental difference from all existing installations consisting in the use of mercury and the mercury boiler for the high temperature, and of the heat conversion circuit and steam, and the ordinary steam boiler for the low temperature end. In other words, a new binary heat engine combination is going to be given a chance to prove its worth, and the fact that the General Electric Company, Babcock and Wilcox, and the Sun Shipbuilding Company are behind this experiment, insures that the mercury boiler will be given every opportunity to prove its value as a practical seagoing installation.

It is not generally known that the Sun Company has already done considerable experimental work with mercury, and their experience with this fluid and its metallic containers will prove of the highest importance in the forthcoming experiments.

British Shipping Radio Improved

Christian Science Monitor, March 6.—The new White Star liner, *Laurentic,* is probably as fully equipped with safety radio as any vessel afloat. Her main installation includes 1½ KW spark and valve transmitters for local and long distance working, and communication with the land can be maintained throughout the voyage. Each lifeboat, too, is equipped with compact sets which comply with government regulations. They are independent of accumulators, as the power to operate the sets is supplied by a petrol-driven generator. There is also a wireless direction finder.

In connection with radio safety devices for ships, it is interesting to note that orders for the automatic S.O.S. signal apparatus have already been placed for 450 ships. This leaves only about 150 ships of British registry which come within the scope of the present regulations regarding wireless apparatus. The installation of this particular device is at present optional, whereas in the future it may be compulsory. Although the apparatus costs £250, economy is achieved by the elimination of watchers to listen for signals when a single operator is off duty.

New Device for Guiding Planes in Fog

Christian Science Monitor, March 20.—A lighthouse of the ether to guide airplanes by visual radio had its first public exhibition at College Park, Maryland, outside this city, and William P. MacCracken, Jr., assistant secretary of commerce for aëronautics, and others, after trial flights, declared it marked a new and important advance in making aviation safe.

The device is mounted on an airplane dashboard to receive signals telling whether the airplane is on its course.

The signal system, they said, will eventually be installed along all federal air routes. Officials witnessing the experiment declared they were delighted with results explaining that the instrument marks an invisible but infallible course along which aviators can fly in rain, hail, snow or fog, despite visibility.

The new instrument is called a visual indicator. Previously directional messages were received by headphones as sounds, by use of a trailing antenna requiring the pilot to listen in order to judge whether he was on the course.

The new instrument catches the radio messages and translates them into dial records. The trailing antenna is replaced by an upright metal rod. Captain Meredith told of flying from Bellefonte, Pennsylvania, recently, using the device with visibility of only one mile. He was guided direct to the landing field without difficulty. The beacon extends 150 miles.

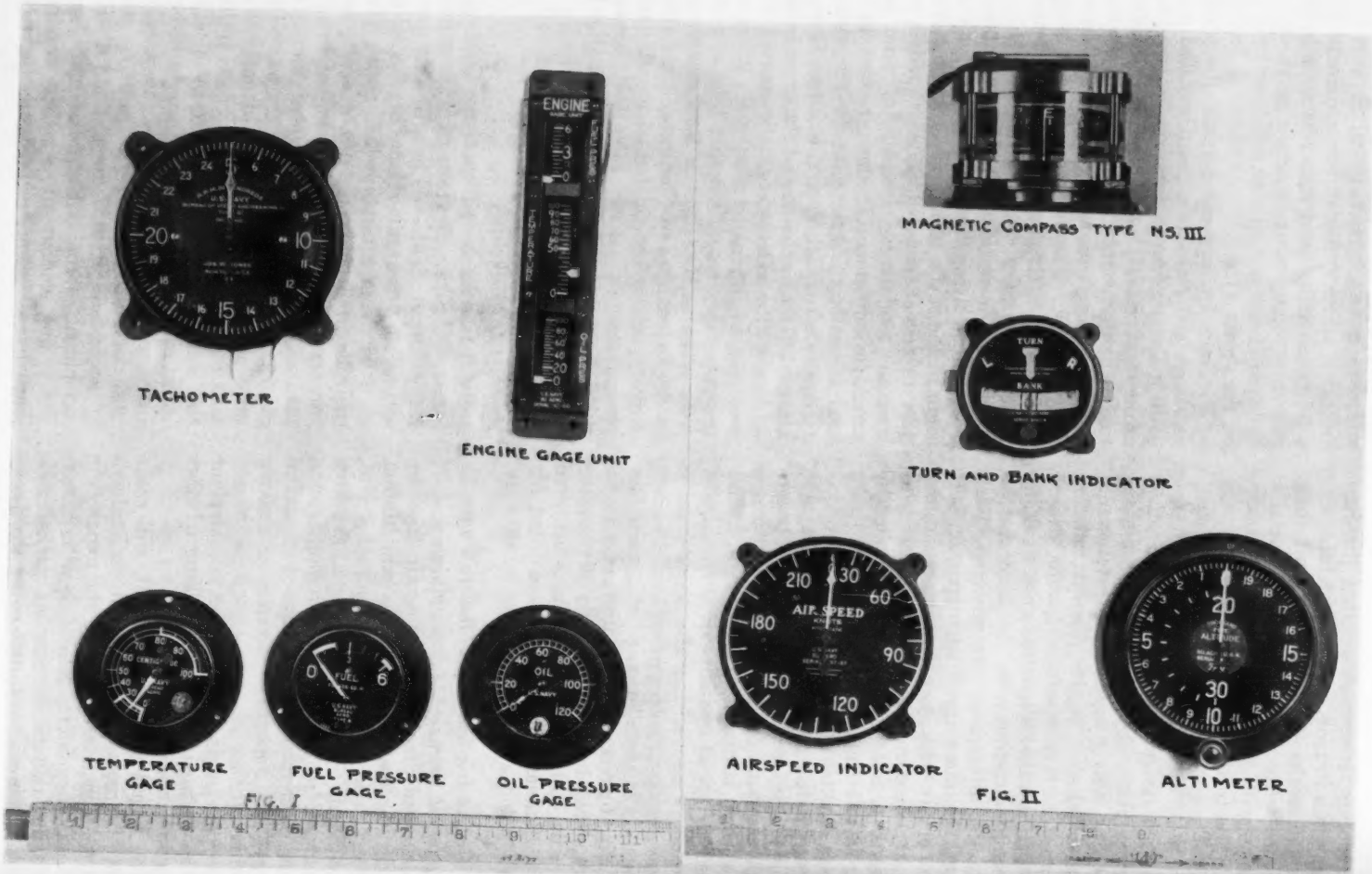
The new device is particularly valuable in "instrument flying," where a pilot is without sight of the earth. The indicator shows two vibrating steel reeds which are tuned to respective modulating frequencies sent out from two antennas at the directive radio beacon station. To the pilot these vibrating reeds make parallel figures, like two Roman numeral "II's" which are of the same height so long as the aviator is on the course. On swerving in either direction, the "I" on the opposite side changes length.

It is announced that it is the intention of the Department of Commerce to establish not only radio beacon but also radio telephone stations along the civil airways throughout the country, probably at all principal airports.

AVIATION

Aircraft Instruments

By Lieutenant Theodore C. Lonnquest, U.S.N., Bureau of Aëronautics, Navy Department.—Although instruments of one sort or another have been employed in balloons and airships for many years, their use in airplanes did not become general for several years after sustained heavier-than-air flight was an accepted fact. The chief concern of early designers was to produce a plane that was able to get into the air and back, in safety, to the ground. With the solution of the primary problems of structural and power plant design came an increase in the capabilities of the plane, and with it a demand for the primary power plant and flight instruments. Further development of the airplane has made it still more independent of weather conditions until it has become a prideful slogan used by pilots in every sort of air activity—gypsy fliers, service squadrons, commercial air



TYPICAL SERVICE AIRPLANE INSTRUMENTS

transport organizations—that their planes are in the air, completing their missions under weather conditions such that "even the birds are walking."

Extension of the airplane's sphere of capabilities has been accompanied and to some extent made possible by the development of the instrument equipment of the airplane. The pioneer pilots had few, if any, instrument aids. A tachometer, a bicycle rider's padded helmet, and a piece of yarn or ribbon secured to a strut, by means of which the pilot could make some estimate as to his flight path, represented all the visible piloting aids in some of the early planes —and often as not the helmet was left behind to reduce weight. Even when instruments did become available, their installation and use in an airplane was frequently considered as a damaging admission of faintheartedness or lack of piloting ability. The epithet of "instrument flyer" was one of scorn and derision. Nowadays, however, the ability to fly by instruments alone, the ability to bring a plane safely through conditions of fog, storm, or darkness—when the ordinary reference points of horizon, ground, and sky are completely obscured—is recognized as piloting ability of the highest order. Perfection, or, at least, a broad experience in "blind" flying, is an essential requirement for every service pilot. It is not improbable, as has been frequently pointed out in the aëronautical press, that some of the failures in recent long distance attempts were due to insufficient experience in blind flying rather than to failures of the airplane's structure or power plant.

The notes which follow will describe very briefly typical airplane instrument equipment as installed in naval aircraft—service instruments as distinguished from experimental, test or aërological instruments. Service instruments are those customarily installed for the purpose of supplying the crew of the aircraft with information necessary and essential for flight. They may be divided arbitrarily into the following classifications: Power plant instruments, flight instruments (which are those used for maintaining control of the airplane along the desired flight path), navigating instruments, and special equipment.

The power plant instrument equipment ordinarily consists of four instruments per engine; an oil pressure gauge, an oil temperature gauge, a fuel pressure gauge, and a tachometer. For water cooled power plants an additional temperature gauge for the cooling water is required, while for certain supercharged engines a gauge is provided showing the pressure being maintained in the supercharger, in terms of feet of altitude. Airplanes having a fuel system in which fuel flows to the carburetors by gravity (an arrangement characteristic of service flying boats) omit the fuel pressure gauge. Figure I shows typical power plant instruments. The temperature gauges, calibrated in degrees centigrade, are of the Bourdon tube type and measure the change in pressure caused by a change in temperature in a liquid or vapor filled bulb and capillary tube system, the bulb being inserted in the engine liquid, oil or water, whose temperature is to be determined. The tachometer, calibrated to read engine R.P.M., is of the centrifugal type, although both chronometric and electric tachometers are in use to a limited extent. Fuel quantity gauges, which properly may be classed with power plant instruments, as employed are of three chief types, the plain sight tube, the float type and the hydrostatic type in which the air pressure necessary to force air out of a tube extending to the bottom of the tank is taken as a measure of the fuel content.

The flight instruments are those primarily used to assist in maintaining control of the airplane along a desired flight path. Figure II shows a group of instruments typical of those supplied to the service at the present time, and consisting of magnetic compass, combined turn indicator and lateral inclinometer or bank indicator, airspeed indicator, and altimeter. Of these, the first three—compass, turn and bank indicator, and airspeed indicator or their equivalents—are absolutely essential for blind flying.

The magnetic compass consists of a very light weight non-floating card from which two horizontal magnets are suspended, the axes of the magnets being parallel to the N-S line of the compass card. The card and magnet system pivots upon a hardened steel point turning in an agate cup, the pivot point forming part of the card system and pointing downwards as distinguished from marine practice where the cup is generally attached to the card. A retainer system, in which the card is fitted, insures that no matter how the compass is capsized the pivot point will always return to the agate cup. The compass is operative until heeled to an

TYPICAL SERVICE AIRPLANE INSTRUMENTS

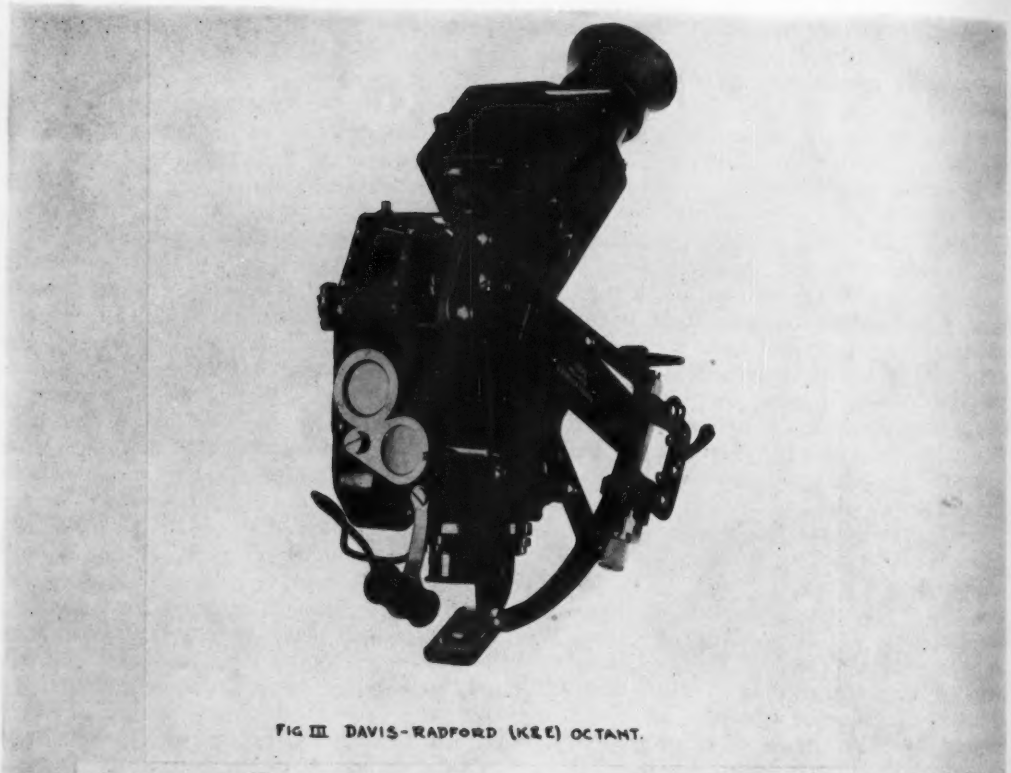


FIG III DAVIS-RADFORD (KEE) OCTANT.

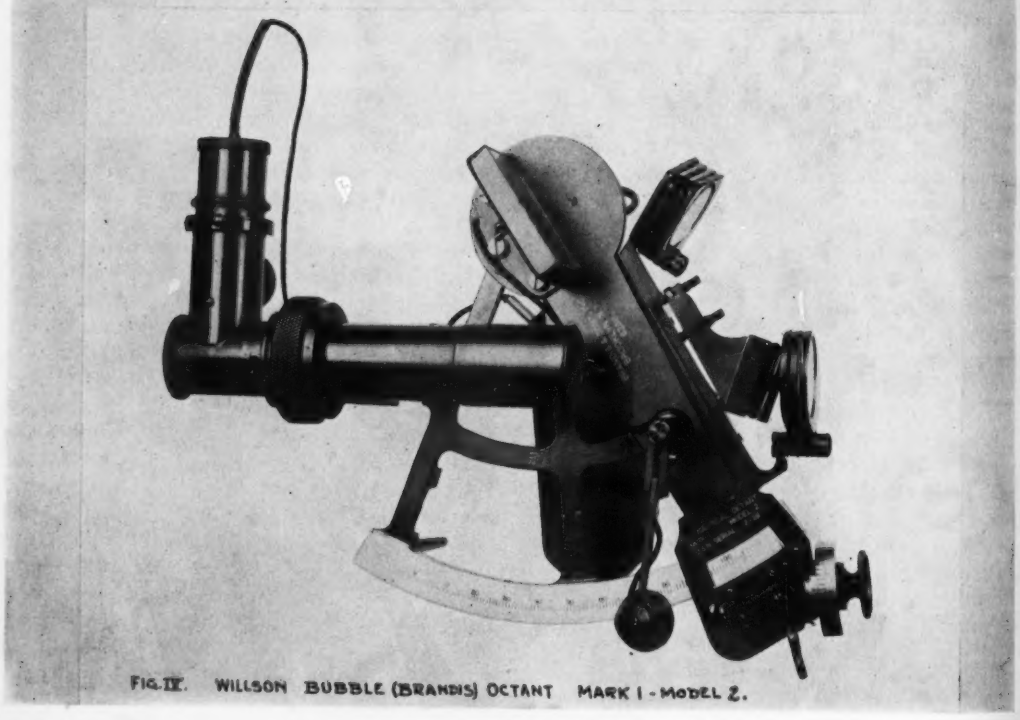


FIG. IV. WILLSON BUBBLE (BRANDIS) OCTANT MARK I - MODEL 2.

TYPICAL SERVICE AIRPLANE INSTRUMENTS

angle of about 20 degrees. The damping liquid is mineral spirits, a petroleum derivative. By the use of a light weight magnetic system having a low moment of inertia and a low center of gravity, careful design of the pivot and retainer parts and the employment of an anti-vibration mount, a reasonably rugged and satisfactory compass results. Proper functioning in an airplane requires, in addition, that the compass be properly installed in a location fairly free from magnetic influences and severe vibration. Movable magnetic material, such as hoisting slings, guns, or controls, or a compass location that demands excessive compensation, will destroy the usefulness of this much maligned instrument. One air navigator of wide experience points out that there is the same tendency to blame poor navigation on the compass that there is for a poor golfer to blame his golf clubs. The magnetic compass should be used only as a direction indicator during straight flight. Whenever the turn indicator shows that a turn is being made, the compass indication should be disregarded until straight flight is resumed.

Another form of magnetic direction indicator now available is the earth inductor compass. While not in widespread service use at present, it is considered to be very promising, and an extension of its use in the future is probable, particularly in scouting and patrol planes. The best known form of earth inductor compass indicates direction in reference to magnetic north and consists of three major elements: (a) generator with driving equipment, the generator having no artificial field, but utilizing the lines of flux of the earth's magnetic field; (b) controller or brush shifting and indicating gear by which the generator brushes may be set to give zero potential when the plane is on the desired heading; (c) a steering indicator consisting of a zero-center galvanometer indicator, showing the electrical potential being produced by the generator. With proper brush setting a required course is maintained by keeping the indicator reading zero. A 180° error in course is avoided by noting that on the proper heading the indicator will move in the same direction that the aircraft turns. One of the primary advantages of this compass is that a favorable location, magnetically, may be chosen for the generator unit, while the steering indicator may be installed in a position convenient for the pilot.

The turn indicator, at present supplied to the service, consists of a small air driven gyroscope rotating about a horizontal athwartship axis, so mounted in a cradle as to be free to precess about a horizontal fore-and-aft axis when the airplane turns about its vertical axis. The torque developed by this precession deflects a spring, the magnitude of the deflection being indicated by a pointer on a dial. A dash-pot is linked to the precessional system to damp out excessive oscillations. Installed in the face of the instrument is a lateral inclinometer, the whole instrument being known as a turn and bank indicator. The turn indicator, or its equivalent, may be considered as one of the key instruments for blind flying. It does not replace the compass and a course steered by the turn indicator alone would probably be a curved path of wide radius. Nor does the use of a magnetic compass, which is dependable only in straight flight, obviate the necessity for a turn indicator. Three ways may be mentioned in which the turn indicator is of primary importance in blind flying. First, when endeavoring to fly a straight course it enables the pilot to detect a turning movement of the plane promptly enough to correct it before his compass begins a confusing erroneous swing or develops spinning tendencies due to a curved flight path. Next, when a turn is necessary, the use of the turn indicator and banking unit in connection with the airspeed meter, enables a correct turn to be made. Finally, should the plane get out of control, the turn indicator will greatly facilitate recovery, by indicating in which direction the plane is turning. The particular value of the turn indicator in blind flying lies in the fundamental method by which a pilot maintains control of his plane, an item which has long engaged the attention of aviation medicine authorities. The pilot orients himself primarily in response to three senses: first, the vision sense; second, the deep-muscle sense, i.e., the so-called "seat sense" or "feel of the ship," and, third, the inner ear sense. Of these, the vision sense appears to be the most important. It has been well demonstrated that as long as a pilot can see even a single fixed point such as a faint horizon or a glimpse of the ground or a light showing through the fog, the three senses coördinate fairly well and flight with a reason-

able degree of safety is possible. If, however, all vision outside the plane is blotted out, not only are the responses from the muscle sense and inner ear sense inadequate for orientation, but in addition the pilot's reactions may actually be entirely wrong and exactly opposite to the reactions he would have had if his vision sense had been operative. To supplement the pilot's senses the flight instruments have been given the most advantageous position possible on the instrument board. The preferred arrangement places the turn and bank indicator in front of the pilot, with the compass above, and the airspeed indicator, tachometer and altimeter grouped closely around the turn indicator, so that the essential instruments may be observed with the minimum of effort and without distraction.

The airspeed indicator in use at the present time is essentially a pressure gauge which indicates the difference between static pressure of the surrounding air and the velocity pressure, as developed by a pitot tube in the free air stream. Although the velocity pressure is proportional to the square of the speed, the indicating mechanism transforms this to a substantially linear scale, calibrated in knots. If connections are kept tight this instrument is rugged and reliable.

The service altimeter is a development of the aneroid barometer, graduated in feet of altitude, the relation being in accordance with an arbitrary formula which defines a hypothetical atmosphere by a suitable altitude-temperature relation called the U. S. Altimeter Calibration Standard. The chief weaknesses of this instrument as an altitude indicating device, aside from the mechanical defects which have been fairly well eliminated, are two: first, the fact that the barometer may change considerably while the plane is in the air; and, second, the change in ground level in point-to-point. However, there is no instrument of comparable simplicity in sight as a replacement for the barometric altimeter.

The line of demarcation between flight instruments and navigating instruments is not clearly drawn. Obviously, the compass, airspeed indicator, and altimeter, and sometimes the tachometer, may be considered as navigating instruments. Of the instruments not yet considered, drift indicators and aircraft sextants are worthy of mention. The actual course of an aircraft over the surface of the earth, called the track, is the resultant of the aircraft's speed through the air and heading, combined with the wind speed and direction. The drift angle is the angle between the heading of the aircraft and the track. One of the simplest forms of drift sights consists of a device similar to a bearing plate. Drift is determined by picking up some object just flown over such as a house, road intersection, or other easily identified topographic feature and following it as far aft as possible, then reading the drift angle. For sea use, smoke bombs are employed, but skilled observers frequently obtain the drift by use of wave crests alone.

Although a number of intercontinental flights have been made without the use of astronomical observations, long range overseas service flying, particularly operations from carriers, will introduce navigational problems of the highest order and will necessitate the employment of every available navigational aid. Practically all forms of celo-navigation make use of the altitude of a celestial body above the horizon. While it is expected that the sea horizon will be used when opportunity permits, when the sea horizon is obscured or for night observations, an artificial horizon is necessary. There are three types of artificial horizons: liquid levels, pendulums, and gyro-stabilized horizons, of which only the first type appears practicable at present. Figures III and IV show two of the latest types of aircraft octants in service. In the Davis-Radford octant, Figure III, a double image of the bubble appears on a narrow strip in the center of the field, coincident with the celestial body being made along a line formed by the intersection of the double bubble image. By the use of an astigmatizing lens the image of the heavenly body may be drawn out into a band or line long enough to span the central strip where the bubble images appear. In the improved Willson Bubble type, Figure IV, a virtual image of the bubble is formed at the focal plane of the telescope through which the heavenly body is being viewed. The bubble is formable and adjustable as to size, coincidence being made at the center of the bubble. Both instruments are suitable for use with artificial and natural horizons, day or night, and both are fitted with quick reading micrometer type verniers with endless tangent screws. Likewise, both are of domestic design and manufacture.

In conclusion, it might not be amiss to point out some of the general considerations entailed in the production of service aircraft instruments. Although the physical forces by which they operate are, in general, small, thereby requiring the use of extremely light parts, they must be sturdy enough to withstand the shock of landings and take-offs and violent maneuvers. They must be highly damped to indicate correctly while undergoing severe vibration or while tilted at steep angles. As far as practical they must be compensated for a wide range of temperature and density. Size and weight are matters of extreme importance. Every pound of weight not only adds its own weight to the plane but entails a corresponding increase in the structural weight of the plane, with its attendant penalty on performance. And, finally, not only must the instruments be mechanically sound, accurate, rugged, and light in weight, but they must be suitable from the pilot's point of view, readily visible day or night, and furnishing information to him at a glance, with a minimum of effort, without distractions, and without making any appreciable demands on his time or attention.

New British "Interceptor" Plane

New York *Times*, March 13.—A rocket-like single-seater fighting airplane capable of climbing practically vertically five miles in ten minutes has passed the tests of the Royal Air Force successfully, it was learned today.

It has been specially built for the defense of London against an air attack, as the result of the disclosure at last summer's night bombing maneuvers that the city is highly vulnerable.

The new machine is believed here to be one of the deadliest weapons for short range attack any nation possesses. It will be known as an "interceptor fighter," from the nature of its task in air warfare. The details of the construction are still secret, but sufficient is known to indicate the interceptor's place among the world's fighting machines.

The tiny interceptors are mere hornets compared with the lumbering bombing planes, which are their special quarry—just one big roaring engine, to which is attached a wasp-waisted fuselage and knifelike wings. So light is its construction and so limited its accommodation that search is being made throughout the Royal Air Force for pilots of the type of Flight Lieutenant Webster, winner of the Schneider Cup trophy, possessing both lightness of frame and the necessary sensitiveness of hand. It is recognized that these interceptors will be one of the trickiest types of aircraft to fly.

As the interceptors will be required only for flights of short duration from bases around London or other manufacturing towns, a saving in weight has been skillfully effected by reducing the capacity of the petrol tanks and oil tanks, but it is estimated that their speed will enable interceptors to patrol 500 miles up and down a limited frontage in two hours.

Nobody knows what armament they possess. It is gathered that only the lightest types of machine guns firing incendiary and tracer bullets synchronized with and firing through the propeller will be carried. The pilot will not carry wireless equipment, because the interceptor will be within visual signaling range of his base until making contact with the enemy. A parachute certainly will be carried, because, other weapons failing, it is planned that the pilot will drive his machine full tilt at the enemy, leaping with the parachute at the moment of impact.

Further Tests of Slotted Wing Safety Device

London *Times*, March 10.—A convincing demonstration of a practically fool-proof Moth light airplane—so convincing that in the end the machine broke its back in a completely stalled landing from a height of 200 feet without the slightest injury to its pilot and designer, Captain Geoffrey de Havilland—was given at Stag-lane aërodrome, Edgware, yesterday afternoon.

It had not, of course, been intended to smash a perfectly sound light airplane costing £650, but Captain de Havilland effectively, if unintentionally, showed that, with the addition of Handley Page automatic slots to this already extremely well-controlled machine, and an improved undercarriage, one of the common errors of an inexperienced or thoughtless pilot which normally would have ended in a fatal accident had no evil results to the occupant of the machine.

It is generally understood now that the main risk in flying is the loss of flying speed at such a low height that it is impossible to recover from the resultant spinning nose-

dive before the airplane has hit the ground end on at high speed. The Handley Page slot gives that control of the machine after it has stalled which enables a pilot to avoid being flustered by the spin, and Captain Geoffrey de Havilland has been experimenting for some months in fitting slots to a Moth and harmonizing the controls to make this popular light airplane as nearly fool-proof as is humanly possible. At the same time he has been designing an improved undercarriage to withstand the much more severe landings which the increased control after the stall makes possible.

His work has now reached the point where the improvements can be standardized in the Moth light airplane, and yesterday he gave a demonstration of the worst errors that a pupil, or an inexperienced pilot, can make, mistakes which on an ordinary machine would have filled the observers with apprehension and anxiety. First he took the Moth up to a height and deliberately attempted to get into a spin, but the controls have now been arranged so that the machine refused to do anything more than descend in a wide spiral, from which any pilot would easily regain controlled flight instead of having to collect his wits while rapidly spinning downwards. Then he illustrated another common error of try-in to land ten feet above the actual earth, and the undercarriage absorbed the shock of this "pancake" on to the ground without a bounce. Next he demonstrated the reverse error of flying into the ground under the belief that it was ten feet farther off, and once again the undercarriage withstood the impact.

Then came the most severe test of all and a maneuver no pilot would willingly attempt, that of deliberately stalling the machine at 200 feet and allowing the machine to sink to the ground at a forward velocity of some 40 miles an hour, but, with the aid of the slots, on a level keel at a vertical rate of descent of not more than seven or eight miles an hour. Captain de Havilland has carried out this test in his experiments a dozen times without any damage to the machine, but on this occasion the forward speed was possibly a little more than usual and the aërodrome had hardened under the sun and wind. He landed practically without any forward movement, the dangerous factor in forced landings, but the machine broke its back between the two cockpits and a second afterwards much to everyone's relief, for the rate of descent was against all the accepted canons of proper flight, the pilot was seen to step quite casually from the wrecked machine to survey the damage. Possibly the explanation is that the undercarriage is now stronger than the machine, which was not specially modified to take the new undercarriage, and while this absorbed much of the force of the impact, the balance transmitted to the machine was too great for the structure.

An examination of the machine afterwards made it clear that the occupants of both the passenger's and pilot's cockpits would be unharmed under such conditions, and Captain de Havilland was not flung forward, the usual result of a crash, nor did he experience anything more than, as he expressed it, everything going soft round him. It must be added that, just as a motor-car is not made fool-proof by four-wheel brakes and non-skid tires, so no designer can make an airplane absolutely safe; but such an advance has been made in this particular machine that, provided a pilot does not stall outrageously near the ground, dive vertically into the ground, or fly at a brick wall, he should be saved from the effects of the very errors which in the past have been the most frequent cause of fatal accidents.

Aircraft Carrier Armament

Army, Navy, and Air Force Gazette, March 15.—The official *Return of Fleets* published on March 1 (Cmd. 3034) discloses that the Japanese aircraft-carriers *Akagi* and *Kaga* are to carry a main armament of ten 8-inch guns. This, it may not be generally known, is the limit allowed for such ships under the Washington Treaty. In a case where 6-inch guns are carried, Article X declares that the number of guns is not limited. But if guns are mounted in excess of 6-inch caliber, the total of such guns must not be more than ten. The Japanese are the first to take advantage of this permission, for hitherto the heaviest armed aircraft-carriers have been the *Lexington* and *Saratoga,* in the United States Fleet, which carry eight 8-inch guns. These two Japanese ships have an armament equal to that of contemporary cruisers, and should therefore be able to hold their own against any of the 10,000-ton vessels now being built, although in a duel they would present a big target and would be unwieldly to ma-

neuver. The chances are that they would never be allowed at sea in war without a destroyer or other escort.

The Ruggles Orientator

U. S. Air Services, March, 1928.—At the Army Primary Flying School considerable time has been spent in an effort to determine the value of the Ruggles orientator in the selection of candidates. This machine, on a stationary platform, is operated by controls similar to those in an airplane and can be put into any flying or acrobatic position by the student in the machine or by an instructor in a side chair attachment. About a year ago a determined effort was initiated to determine if this machine had any real value in the selection of students, and, if so, whether others than Mr. Ruggles, the inventor, could operate it successfully for this purpose. Some claimed that the apparent success of the predictions on students made by Mr. Ruggles was due to his knack in sizing up candidates and that he was really ninety per cent of the machine. Obviously, if no other could employ the machine successfully, it would be useless for the purposes desired. Therefore, seven flying instructors with varying degrees of experience as such were detailed to this machine. Each student of the entire class of 200 students was given three periods on the machine of ten minutes each on three successive days prior to initiating flying instruction. The grades arrived at independently by each instructor were not only not known by the school personnel but in no case were ever used against a student. Of the first 64 students who had to be relieved due to unsatisfactory progress in flying, it was found that one of the orientator operators had graded as below passing 56, another 55, another 54, two 53, one 50, and one 48. The last two were young officers who had been instructed for only a few months. Mr. Ruggles had predicted 51 of these 64 as failures. Of the first 108 relieved, the results were still more striking as to the success of the experienced instructors. It was also found that those with good grades were not only not being "washed out" but were almost invariably the first to solo and the most advanced on the stages, and that practically all the graduates at the Advanced Flying School had passing grades, or above, on the orientator. It has therefore been conclusively demonstrated that the orientator has some value in the selection of students and that only experienced flying instructors should be used in their selection. For this reason, and very correctly so, all candidates for the July class were put through this test by a board of three officers at Brooks Field, but were rejected only if they failed in both this test and in the neuro-psychic examination made by specially trained flight surgeons.

Ice on Plane Wings

Baltimore *Evening Sun,* March 29.—Man's conquest of the air has met many obstacles and from many unlooked-for sources. The formation of ice on the wings and other parts of an airplane in flight is one which is engaging serious attention just now.

It is not a new phenomenon. It was definitely reported seven years ago, but it has always been considered a freak consequence of freak conditions. Fog is unusual at freezing temperatures. It has even been said to be impossible. But it has and it does occur.

This unfriendly gesture of nature is a very serious hazard in flight. Colonel Charles A. Lindbergh has called it the greatest.

The conditions which provide the phenomenon are not understood. It is similar to the formation of sleet on trees, but that does not by any means appear to be the whole story. Attempts at reproducing the ice condition in the laboratory have failed. Further mystery is supplied in the fact that it has not been reported except by American planes in North America.

The accumulation of the ice, once it starts to form, becomes distributed over the front edges of the wings, of the struts and other parts. That it could form on the blades of the propellor running at 1,500 revolutions per minute has been scoffed at as an impossibility, but it is nevertheless a definitely established and recorded fact.

Ice is heavy and even a thin coating on an airplane can provide a considerable additional weight to overload the plane. But two other ways in which the ice forces the airplane down are of even greater detriment. As the ice forms it mushrooms out along the front edges and forms bulges and bumps along the forward part of the wings. In the first place this greatly increases the air resistance requiring more power to pull it through the air and in the second the

proper shape of the wing contour which provides the lifting force is seriously interfered with. These, with the added weight of the ice, drive the plane down lower and lower and finally force it to the ground.

Many remedies and preventives have been suggested and have been tried. How effective any will be is difficult to state since it seems almost impossible to try them out so illusive are the conditions which produce the effect.

Some possibly promising remedies are: Smear the airplane with grease or oil so that it will shed the ice before it sets. Another similar method, to the grease or oil add salt or a chemical which will produce a solution with a lower freezing point.

MISCELLANEOUS

Naval Uses for Seaplanes and Flying Boats

Journal of the Royal United Service, February, 1928, *by Commander E. T. R. Chambers, A.F.C., R.N.*—It is not the intention of the present writer to indulge in any controversial matters connected with the R.F.C. (Naval Wing), R.N.A.S., or the present R.A.F., but merely to outline the development and future of seaplanes and flying boats for naval purposes.

Pre-War Conditions

Before 1912, only two builders and designers, Messrs. Short Bros. and Messrs. Sopwith, applied themselves seriously to the development of seaplanes and, so far as the Navy was concerned they had only attained the experimental stage. By 1913, however, the Admiralty were already convinced of the practical value of these aircraft for coastal and sea reconnaissance work, and commenced to build a series of Air Stations along the South and East Coasts. By the end of that year seaplane bases had been completed at Calshot, Isle of Grain, Felixstowe, Yarmouth and Dundee.

The seaplanes then in use for service work included Maurice Farmans, Henri Farmans, Borel monoplanes, various types of Shorts, Wights, and Sopwiths. They all suffered from being underpowered and this seriously detracted from their value. Nevertheless, early in 1914, a sea patrol exercise was carried out at the entrance to the Firth of Forth by four Short tractors, each being fitted with wireless, which at that time was in an experimental stage in seaplanes. It happened to be foggy weather during the whole period allotted for the exercise, but, in spite of this the patrols were completed and wireless reports sent in regularly.

About this time two machines of great interest were evolved by Messrs. Sopwith. One of these a forerunner of the flying boat, was of exceptional interest. Known as a *Bat-boat*, it was fitted with a single engine, something on the lines of the F.B.A. boat, afterwards evolved by the French and much used during the war. It was easy to handle and night landing was carried out with success in the beam of a searchlight at Calshot. The other was a huge machine, built with the idea of dropping a 14-inch torpedo. After many attempts and many disappointing hours spent in "taxiing" about Southampton Water, it did eventually manage to struggle off carrying the torpedo. It was not a success, but it was a move in the right direction.

The Wights were also delivered in 1914. In their day they were wonderful machines, as they got off after about a 50-yard run, owing to their great lift and beautifully designed floats. Their speed was about 80 knots. Their career came to an end when the first machine delivered nose-dived from about 200 feet, killing pilot and passenger in June, 1914. The writer well remembers poor Lieutenant Cresswell, R.M., who had turned this machine over to him and was up for his last flight, saying, "She's a wonderful machine with lots of power but for goodness sake don't ever bring her down at over 70 knots as she won't come out of it"—She didn't!

The Naval Review came in June, 1914, and the seaplanes, which had assembled at Calshot from Grain and Yarmouth, had the honor of taking part in it, flying from Calshot to their buoys at Spithead, lying there during the Review, afterwards flying round the Royal Yacht and the fleet and returning to Calshot. Even then the uncertainty of flying material was such that, out of the eighteen machines nominated to take part in the Review only fourteen actually arrived at their buoys, whilst on the return to Calshot only eight got back without a failure of some sort. In justice to those who took part in this Review, I feel that I must add that no machines were damaged owing to crashing or to any errors of judgment on the part of the pilots.

The day after the Review all the visiting

seaplanes returned to their own stations. Then came the orders to mobilize and all the Calshot machines were directed to proceed by air to the Isle of Grain.

Seaplanes in War

a. *In Carriers.*—On the outbreak of war the demand for vessels to carry seaplanes became pressing, and, as a first step, the Admiralty took over Cross-Channel steamers and one tramp steamer for this service. The *Engadine, Empress,* and *Riviera* were fitted out at Chatham to carry four seaplanes each, whilst the tramp steamer, which was renamed *Ark Royal* was fitted to carry ten seaplanes. Early in 1915, the *Ben-my-Chree* was also taken over and adapted to carry four seaplanes.

The *Engadine, Empress* and *Riviera* took part in the Cuxhaven raid in December, 1914. The *Engadine* was also present at the opening stage of the battle of Jutland and sent up one seaplane which obtained some details as to the composition of the enemy. The *Ben-my-Chree* saw service in the Mediterranean and was eventually sunk by Turkish gunfire in 1917.

A further ship, the *Viking* renamed the *Vindex,* was fitted for carrying seaplanes. This ship was in some respects an advance on her predecessors, inasmuch as she was the first to be fitted with a flying-off deck for airplanes. She carried four large and one small seaplane aft and two single fighters (airplanes) forward, these latter machines being stowed dismantled. It is of interest to record that from this ship a naval pilot first attacked a Zeppelin at sea, unfortunately unsuccessfully.

Late in 1914, the old Cunard Liner, *Campania,* of 20,500 tons was converted into a seaplane carrier for fleet work. After colossal alterations, she carried twelve seaplanes and was fitted with a large flying-off deck forward for launching seaplanes on wheeled trolleys, thereby avoiding the danger of stopping to hoist them out. Owing to a misunderstanding about sailing orders she failed to put in an appearance at Jutland. She was not a success as her speed was insufficient to enable her to work with the fleet, but, from her, most valuable lessons were learned and embodied in later ships. She was sunk by a collision at anchor in the Firth of Forth in November, 1918.

Other seaplane carriers completed during the war, were the *Pegasus, Nairana, Manxman,* all small ships carrying from seven to nine machines.

This brief summary must suffice to describe the use of seaplanes from carriers in the war. The various uses made by the Navy of airplanes (landplanes as they have since been officially designated) is a separate subject which does not come within the scope of this article.

b. *General Seaplane Work.*—Seaplane work was carried out from the stations built at Dunkirk, Dover, East Fortune, Scapa Flow, Milford Haven, Cattewater, Firth of Forth, Gibraltar, Malta, Dardanelles, etc., in addition to the original stations at Calshot, Yarmouth, Dundee, Isle of Grain, Felixstowe. Seaplanes were also sent out to the East Coast of Africa, where they suffered considerably from warped propellers.

Short and Sopwith machines were employed and these two types remained more or less standard for the whole period of the war. Practically no advance in seaplane construction was made during the war except that a slightly greater speed was obtained owing to the invention of higher H.P. engines.

The work of these aircraft was almost entirely confined to sea patrols. There was little or no glory attached to it, but very hard and exacting work was involved. Reporting enemy submarines and bombing them when possible was the sum total of excitement experienced.

The Future of Seaplanes

If one looks back to the finest seaplane in 1914 or even in 1913, it was the 80 H.P. Short. Now in 1928 we have the *Fairey III D,* which, without prejudice, is exactly the old 80 Short with a higher H.P. water-cooled engine. This is the total progress in seaplanes from 1913 to 1928. Freak machines can be and are built to do record-breaking speeds, but they are none too stable on the water and cannot stand even a moderate lop. These are all very well for winning Schneider Cups and performing other soul-stirring feats, but they are of no use for service purposes. Many of their features may prove useful for embodiment in future machines, but the present writer sees no use for the seaplane in future and believes that its place should and will be taken completely by the flying boat, which has a great future before it.

FLYING BOATS IN THE WAR

The development of flying boats to their present state is almost entirely due to the perseverance and initiative of the late Commander Porte, Royal Navy. In 1913 there was one small experimental pusher flying boat in Great Britain. This was built by Messrs. Sopwith. The hull was about 20 feet long and 4 feet beam, and had a "step" in it like a hydroplane racing boat; it was a biplane with a single engine. In the same year, Commander Porte, who had retired, joined Messrs. Glen Curtis in New York with the idea of constructing a flying boat to cross the Atlantic. On the outbreak of war, Porte naturally joined up with the R.N.A.S. and Curtis flying boats were procured from America. These machines were very unsatisfactory and much underpowered, but from this early type, Porte constructed the modern flying boat, in stages passing through the *Improved Curtis, H-12, F-2.A.,* and *F-5,* culminating in a wonderful triplane boat named, *Felixstowe Fury,* which was completed in November, 1918, too late for use in the Great War.

Incidentally it should be noted that an *H-12* flying boat destroyed the Zeppelin *L-22* on May 14, 1917, near Terschelling.

The seaworthiness of the *H-12* type was shown to be of a high order as the same boat was three days adrift subsequent to an engagement with Zeppelins and hostile vessels but, in spite of shot holes in the hull and severe weather conditions, she was still able to keep afloat.

During the war, flying boats working from Felixstowe and Yarmouth carried out regular patrols almost daily to Borkum and in the Heligoland Bight. These patrols were usually of about seven hours' duration, and it speaks well for design, piloting, care, and maintenance when it can be stated that breakdowns were almost unknown. To prolong the time flying boats could remain in the Heligoland Bight, special towing lighters were constructed to carry them to Terschelling Light Vessel. Here they were launched and could then carry out their patrol right up the Bight returning to Felixstone or Yarmouth by air.

LATER DEVELOPMENTS

The *Felixstowe Fury* was a step forward in flying boats which was years ahead of its time and it has not yet been either equalled or passed. It would be of interest to know what happened to the plans of this wonderful craft, but a short description of it may, at any rate, be of interest. The writer believes he is the only pilot living who had the privilege of flying her. She was a triplane boat with five 360 Rolls Royce engines; she had a crew of six and carried four to six machine guns and fifteen hours' fuel, and could attain a speed of 90 knots and, with full load, a height of 10,000 feet. A trial carried out in July, 1919, when the wings were getting a bit "soggy," is of particular interest. With three and a half hours' petrol and three passengers the boat climbed easily to 15,000 feet, her ceiling being 17,500. It was estimated that with new fabric planes, not warped as these were, she would have reached 20,000 feet. Think of this, in 1918, for a flying boat! She had many other advantages—no blind spot, splendid maneuverability, easy to fly, land and take off.

Work on flying boats completely stopped at the end of the war, as the authorities considered they were useless. Luckily, in spite of lack of interest, and of orders, some firms, notably the Supermarine Aviation Company and Messrs. Short, held to their belief in this type of aircraft. The former firm worked hard at improving the flying capabilities of the last design of flying boat used during the war—the *F-5*—and after months of uphill work turned out the *Southampton.* Now that flying boats are at last beginning to take their proper place in aviation, this represents the latest development.

Large flying boats have been attempted by various other firms but none of them has proved satisfactory. Messrs. Short Brothers have specialized in steel and in duralumin hulls and floats and have evolved a watertight and lasting hull which should do much to further progress. The "seepage" of the wooden hulls used in the olden types was a constant source of trouble and added enormously to the weight. It should be noted that during the war the wooden-hulled boats were invariably overloaded by approximately one ton, and although some of this was naturally due to "gadgets," the porous nature of the wooden hulls contributed largely to the defect.

THE FUTURE OF FLYING BOATS FOR NAVAL PURPOSES

At the present time the number of flying boats in use by the R.A.F. is inadequate

Distinguished Naval Academy Graduates in Civil Life

MORTIMER E. COOLEY, *left*

IRA N. HOLLIS, *right*

ROOMMATES at the Naval Academy and closely associated since 1874, their careers have been similar to a remarkable degree. Both graduated from the Naval Academy as Cadet Engineers in 1878; were shipmates on the *Quinnebaug;* and both have followed engineering since graduation: both are past presidents of the American Society of Mechanical Engineers. Each has four children in the same order: girl, boy, two girls. Commander Hollis Cooley is the Cooley boy. Their pictures are published together because of the close friendship and association which has existed throughout their distinguished careers.

Mr. Cooley resigned from the Navy in 1885. He was detailed by the Navy Department in 1881 to teach "Steam Engineering and Iron Shipbuilding" (as the Act reads) at the University of Michigan. At the end of four years he was invited by the Regents to resign and accept the chair of Mechanical Engineering permanently. He became Dean of Engineering in 1904, and of Architecture in 1913. He served as Chief Engineer of the *Yosemite* and at the League Island Navy Yard in 1898–99; and as Educational Director in the Students' Army Training Corps in 1918. He is a past president of the Michigan Engineering Society, the American Society of Mechanical Engineers, the Society for the Promotion of Engineering Education, and the Federated American Engineering Societies, now American Engineering Council.

Mr. Hollis resigned from the Navy in 1893. He was detailed by the Navy Department in 1881 to teach Steam Engineering and Iron Shipbuilding at Union College, Schenectady, N. Y. On completion of this duty he returned to the Navy, designed the machinery of the *Nashville,* and served on the *Charleston* in her memorable chase of the Chilean *Itata;* repaired the wrecked engine of the *Itata* and came north in her. He assisted in framing the personnel act after the Spanish War. He was invited to the Chair of Engineering at Harvard University in 1893, served there until 1913, then was called as president to the Worcester Polytechnic Institute, retiring in 1925. He is an author of note, and a member of numerous professional, scientific, and literary societies.

Courtesy of Captain T. A. Kearney, U.S.N.

IN HONOR OF REAR ADMIRAL VOGELGESANG

Captain Frederico Villar, Brazilian Naval Attaché, placing a wreath upon the grave of Rear Admiral Vogelgesang in the Arlington National Cemetery, commemorating the first anniversary of the Admiral's death.

for naval requirements in a future war.

Flying boats will be required in hundreds for coastal reconnaissance, submarine patrols, and convoy work and this, not improbably, at a time when enormous demands are being made for aircraft, pilots and ground organization for other than naval air services.

So far the question of employing flying boats for the Fleet Air Arm has not been touched on. At present the Fleet Air Arm uses airplanes as fighters, reconnaissance and spotter machines and for torpedo machines, but it is worth considering whether flying boats might not be used for some of the fleet air work. Their advantages may be summarized as follows:

1. For reconnaissance and spotting, the flying boat, with its eight hours' endurance, is worth more than two airplanes despatched in succession with only four hours' endurance.

2. They do not require a huge vulnerable ship with an extensive flying deck from which to work. It should be possible to launch flying boats from a smaller type of carrier, preferably from a landing stage protruding from the stern rather than by hoisting out with a crane or derrick.

3. They do not necessitate the carrier steaming at high speed into the wind, and often, therefore, away from the fleet, for launching or landing on.

4. They can refuel anywhere and from any vessel.

5. They do not require an escort as they are very powerfully armed and, if attacked have nothing to fear if they come down to about 100 feet to safeguard the "blind spot" under the tail.

6. They can fly with one engine broken down. In the event of a forced landing they float indefinitely where an airplane drowns in half an hour or less.

7. Under suitable conditions, the crews can live on board.

The disadvantages are:

1. Large flying boats do not "fold" like the reconnaissance and spotter airplanes, they therefore require more storing room; but this difficulty can probably be overcome.

2. They cannot keep in company with a fleet by "taxiing" on the surface for a prolonged time.

3. A satisfactory method of launching these craft from a carrier at sea has yet to be devised.

4. It has yet to be proved that they can get up in a sea where airplanes can still be flown off a carrier.

5. A satisfactory method of getting them in at sea has still to be devised.

6. The flying boat carrier must still be a really fast ship, as she will have to stop or at least slow down considerably to launch her aircraft. This, however, should not cause her to lose the fleet as the airplane carrier is liable to do.

Flying boats are not suitable for fighters or as torpedo machines but if they can be used for reconnaissance and spotting it will allow for more airplanes to be taken in the carriers with flying-off decks as fighters and torpedo machines, duties for which airplanes are better suited.

Some of these disadvantages may appear to be insuperable, but it should be borne in mind that so little interest has been taken in flying boats up to now that their capabilities and uses have not really been explored, nor is the Navy yet in a position to ascertain whether they can solve any of its aviation problems.

In design no very marked improvement has been effected since 1918 when a boat was actually flown which carried fifteen hours' fuel and which had a speed of 90 knots and a ceiling of something approaching 20,000 feet. The cruise to the Far East by *Southampton* flying boats now in progress could have been done ten years ago, but no one was interested in this type of aircraft. Today its commercial prospects are becoming more and more obvious.

From a naval point of view there would seem strong arguments for testing their value for fleet air work, while the experience of the war gave ample evidence to show that they will be essential for coastal reconnaissance, anti-submarine patrols, and as escorts for shipping in narrow waters; but if they are to be properly constructed to enable them to perform these services it is all important that they should be specially designed to meet naval requirements.

Sizes and Functions of Cruisers

Naval and Military Record, February 29.—If the British Admiralty could "have its time over again" at the Washington Conference, there is very good reason for believing that a considerably smaller maximum limit than 10,000 tons displacement would be the result. That the general feeling of the con-

IN HONOR OF REAR ADMIRAL VOGELGESANG
Captain Frederico Villar, Brazilian Naval Attaché, placing a wreath upon the grave of Rear Admiral Vogelgesang in the Arlington National Cemetery, commemorating the first anniversary of the Admiral's death.

Courtesy of Captain T. A. Kearney, U.S.N.

ference of 1922 was in favor of a lower limit is a matter of history. But, rather unfortunately, we had the ships of the new *Hawkins* class on our hands, two of them still being incomplete, and the Admiralty was very averse to the idea of having to scrap them. There was no really strong opposition to the 10,000-tons proposal, only a general implication that it was too high a figure, since for years previously the naval world had been satisfied with an average of about one-half that displacement as quite adequate. Probably there was also a feeling that merely setting a maximum limit did not impose any obligation to build up to it. Anyhow, tonnage and gun calibers were finally determined after much discussion in which there was little real controversy, and the *Hawkins* class was saved.

Five years later we find rather a curious reversal of viewpoints. At Geneva the United States, which had not been at all keen upon the limits set at Washington, was strongly insistent upon them, whilst we, who were the sponsors of those limits, were equally anxious to reduce them. A plethora of academic contention was put forward on both sides. Mr. Bridgeman fairly summarized the gist of the arguments when he said that the United States wanted "aggressive" cruisers, whilst we only wanted "protective" cruisers. It now appears that we intend carrying our point into effect without reference to what any other power may do, and that no more 10,000-ton cruisers will be laid down under the terms of the five years' replacement program. By the time that program has materialized—that is to say, as far as it will materialize—the Washington Treaty will be due to come up for revision, when, as a great thinker profoundly remarked, we shall see what we shall see. In the meantime a little clear thinking upon the rather wide subject of the functions of the cruiser might prove a useful preliminary to resuming discussion of tons and guns.

It was our own adherence to the doctrine of aggression as the primary rôle of the cruiser which produced the battle-cruiser. In the *Drakes* the *Cressys* the *Devonshires*, the *Warriors*, and the *Shannons* we had produced armored cruisers of progressively formidable qualities. But the process does not appear to have been governed by any more definite principle than the desire to "go one better" every time. The materialists were entirely in the ascendancy, and openly proclaimed that they were now giving to the Fleet a type of cruiser quite capable of taking her place in the line. The late Lord Fisher was only following this tendency to its logical conclusion when he completed the cycle by producing a cruiser of the line. Then, after the "shouting and the tumult" of admiration had died down a little, the perplexed tacticians began to ask "What about it?" Was the battle-cruiser to replace the armored cruiser and the protected cruiser? The useful little "crinoline ships" were getting worn out, and for years past nothing had been built to replace them. Did this evolution of cruiser design mean that the functions of the cruiser had radically changed? Had "the eyes of the Fleet" become the fists of the Fleet? In short, where were we?

The question was answered by the production of the *Scout* class, followed by the birth of the "light cruiser," which was an euphonious reversion to the protected cruiser. Luckily, by the time the Great War broke out we had built up a large fleet of light cruisers, although, as we soon realized, not nearly large enough: probably it is true to say that it could never be that. It is impossible to argue conclusively upon the strategical requirements of the next war from the experiences of the last war, because geographical conditions may be so totally different. The "aggressive" cruiser had one signal triumph during the Great War—at the Battle of the Falklands. No other type of warship could have achieved that performance. But suppose it had not been achieved with such dramatic completeness. Von Spee's force could not have lived much longer than it did. Still, we must take things as they are, and the Battle of the Falklands was a triumph for the super-aggressive cruiser over the aggressive cruiser.

With all this in view, the Admiralty has come to the conclusion that it is not sound policy to build cruisers for future possible Falklands. The light cruiser proved a type of pre-eminent value during the whole course of the war. Owing to the comparatively small zone to which naval operations were narrowed down after the end of 1914, she was built perhaps a little too much on the light side. That is to say, her radius of action was too limited for oceanic warfare. But the *Hawkins* design was a spasmodic jump to the other extreme. The fog of war often blurs the perspective, and

apparently the Admiralty thought the Germans might produce a type of super-Emden which they must be prepared to counter. We now know that the Germans had entirely gone out of business in the aggressive cruiser line, and were concentrating the whole of their resources upon submarine construction. To this form of activity the light cruiser is the most effective response. As we had not sufficient numbers for the purpose, the destroyer had to undertake light cruiser work, supplemented later by a variety of patrol craft suitable for duties in narrow focal zones.

The cruiser remains as important a fleet unit as was the old frigate. But we are by no means clear as to why she must be an "aggressive cruiser" for fleet work. The little *Southampton* at Jutland did all that any fleet cruiser can possibly be expected to do. Had she been twice the size, and carried 8-inch guns instead of 6-inch guns, it is impossible to see that she could have done more. The "fleet work" of the cruisers became rather jumbled up at Jutland, and several were lost through being where they ought not to have been at all—through no fault of their own, but owing to the general mix-up of battle. The fact is, it becomes very difficult to define the functions of the aggressive cruiser after laying it down, in a general way, that she is designed to act with the battle fleet. On the other hand, the rôle of the protective cruiser, or of what the tactitians call the control cruiser, is quite clear cut. Her aggressiveness lies in trade defence. She must be big enough and strong enough for this work—and no more, because her metier essentially demands numbers. In our own view the *Emerald* type represents an admirable mean of cruiser efficiency and sufficiency for the British Navy. She is not so powerful as the 10,000-ton type produced by the Washington Treaty, but she is not so much less powerful as not to be able to give a very good account of herself against such a vessel. It is impossible to have it all ways, and the "best" warship of any class is the one which represents the most successful compromise of conflicting possibilities.

Concerning Guns

Naval and Military Record, February 15. —*By Sir Herbert Russell.*—We are not favored with much official information regarding naval guns or naval gunnery these days. I have more than once expressed the view in this journal that we might be told something about the shooting of the Fleet. I am sure that the publication of the battle practice returns in pre-war days had a stimulating effect upon the marksmanship of the Fleet, and if there was no objection to publishing these figures then, when we certainly did not want to give unnecessary information to Germany, what objection can there be now, when it does not matter who knows just how well our ships can shoot? One defect of too much secrecy is that it rather tends to awaken suspicion by suggesting the idea that there may be something to hide. Let me add that I am quite sure there is nothing to hide in the present-day standard of our naval marksmanship. Therefore, why hide it?

Regarding the question of the guns themselves, this is another matter, and I agree that we do not want to advertise just what we are doing in the development of our naval weapons. Before the war there was a long controversy, which was finally settled by the war itself. One school held that our wire-wound guns were the best in the world. Another, and, I fancy, a very much smaller school, held that the Krupp solid tube guns were better than ours. When I say this contention was settled by the war itself I should be more explicit. In the early days of the conflict we had some nasty surprises. We found that the 4.1-inch Krupp mounted by German cruisers outranged the 6-inch guns of our cruisers. It was futile to boast about throwing a shell more than twice the weight against an enemy who could hit us when we could not reach him. On the whole I am afraid that history will record that the German shooting was rather better than our own. Probably this was not entirely due to any question of the relative merits of the guns. Their range-finders and other optical instruments were distinctly better than ours. Let us take the figures of the Battle of Jutland as given in the *German Staff History,* the statistics in which I believe, are accepted by our own Admiralty as correct. Altogether we fired 4,598 shells; the Germans fired 3,597 shells. We scored 100 hits; they scored 120 hits. Our percentage of hits was 2.17; theirs was 3.3. We expended 1,239 15-inch, 42 14-inch, 1,533 13.5-inch shells; they expended 2,424 12-inch and 1,173 11.2-inch shells. The wide disproportion between our losses and

theirs was by no means due to the question of respective marksmanship. The armor protection and anti-fire arrangements of our ships were inferior to those of the German ships, and a large proportion of our projectiles and fuses proved defective. But it is impossible to deny that the Krupp artillery justified itself.

The wire-wound gun was excellent when it came out because in those days we were satisfied with short weapons. The total length of the 12-inch *Mark VIII.*, including chamber, was 35.5 feet, and of the *Mark IX.*, including chamber, 40 feet. In the latest 12-inch type, *Mark X.*, we advanced to 45 feet. A big gun of 35 calibers presents a very different constructional problem from a big gun of 50 calibers. Every excess foot beyond the mounting center multiplies the drooping leverage enormously. Now the wire-wound process gives immense resistance to expansive forces, but it is integrally weak in horizontal resistance. Or, perhaps it would be more correct to say that it lacks the rigidity of a solid tube. The rifled tube within the coil and the outer jacket without are the sources of stiffness to the wire gun, and experience—which, after all, is the real arbiter in the matters—has proved that within limitations this stiffness is adequate and enduring. But the progressive tendency in ranges has now brought us to a stage when the inherent disadvantage of the wire gun as against the solid gun soon begins to manifest itself in service.

Great Britain is the only naval power which has favored the wire gun for a good many years past. All the others prefer the solid gun, built up of steel tubes overlaying one another. The process of construction is to slide a whitehot jacket on to a cold jacket, and let it shrink to practical solidity. But a new method has lately come into general use. The tubes are fitted into their proper position cold, which means that they form a sliding fit under pressure. Internal pressure is applied to the extent of about 6,000 atmospheres, or twice the strain to which the gun would be subject under discharge. The chief claim put forward on behalf of this system of gun-building is that it is economical. But to subject metal to a stress twice as heavy as it is intended to bear in use is not a principle in which any engineer would agree. Many a boiler has given out through weakness developed by an unnecessarily severe test.

In one respect the wire gun probably has a considerable advantage over the solid weapon and this in its better capacity for shock absorption. In bygone days, when these things were less clearly understood, the heavy turret gun was fashioned very much in the shape of a soda-water bottle. The result was that it kicked fearfully on discharge and took a relatively long time to recover its recoil. The modern tube-shafted heavy gun absorbs the shock of discharge very evenly. As the rate of recoil is a very important factor in determining the rapidity of fire delivery every effort is naturally made to recover set-back as swiftly as possible, more particularly in the lighter guns. The momentum of a 100-ton gun, flung back from the base of a shell weighing a ton by a blast which starts that shell off at the rate of nearly 3,000 feet a second wants some curbing.

Droop, of course, is the haunting problem of the gun designer. The intense heat generated by firing several rounds in succession tends to facilitate the natural tendency of a long, enormously heavy barrel to sag under its own weight. The growth of caliber has increased the difficulty. A 15-inch gun of 45 calibers is one-quarter as long again as a 12-inch gun of 45 calibers. The additional thickness of the tubes to meet the extra longitudinal stress is largely neutralized by the addition of weight. The one rather negative satisfaction which the gun builder finds is that the effective life of the very big weapon is pretty short in any case, and that probably the rifling will be suffering from erosion before droop becomes an appreciably serious factor. I imagine that the cold-built solid gun, internally expanded as I have described, cannot be retubed at all unless it is bored for the purpose. Probably it would be more economical to build a new one.

That the modern naval gun, whatever its type, is a weapon of marvelous precision is one of those facts which it seems a mere platitude to repeat. Yet as every gunner knows there are degrees of excellence even amongst the guns of uniform type in a single ship. The question of the effective life of a gun, comparatively unimportant in peace apart from economic reasons, may become vital in war. It is not difficult to conceive a conflict in which battleships might be employed in a zone very remote from a home base, and in which they might use their big

guns rather actively. It is true that we maintain a reserve of guns for all our capital ships and there might be no particular difficulty in transporting these to the central base of the struggle. On the other hand, there might be insuperable difficulties to hoisting out the old guns and mounting the new ones, for I doubt if the Admiralty have ever visualized the necessity for 100-ton cranes in overseas bases in what have so long been cruiser stations.

On this subject I must needs return to my theme that the big gun of today is altogether too big. It is not because I find any satisfaction in quoting the Germans against ourselves that I once again refer to the figures at Jutland which I have given above. If these mean anything it seems to me that they demonstrate the point that the 11.2-inch and 12-inch guns are big enough for any naval battle. Yet we have now adopted the 16-inch gun—a truly wonderful weapon, no doubt, with a six-mile trajectory in its 25-mile range. For shooting most of the contents of the magazines into the sea it is undoubtedly an ideal weapon. Who wants to fight at 25 miles, or at half 25 miles, if he really wants to fight at all? The enthusiasts talk about ærial spotting. I have yet to meet the airman who can tell me how, in salvo firing by a battle squadron, he can determine at 25 miles just what ships are firing short or straddling; how, unless he is hovering directly overhead, he can observe fire effect so accurately as to be able to give corrections, and how, in any case, he is going to talk to the fire-control people.

But with the very definite movement toward smaller warships which the British Admiralty is leading, smaller guns will inevitably follow. The surplus energy of the monster weapon is the simple result of competition. We thought that the Japanese victory at Tsushima was the triumph of the bigger guns. Jutland did not confirm this opinion. There is a lot of vague talk among the champions of bigness about superior smashing power. Once again Jutland did not demonstrate this superiority. The idea that the knock-out blow will depend upon a few pounds more of bursting charge seems to me more sketchy than practical. The shooting of the Fifth Battle Squadron at Jutland is admitted by the Germans to have been magnificent. Yet their 15-inch smashing blows secured no knock-out. The Battle of the Falklands may be quoted in contradiction of this argument. But here von Spee was outranged, just as he outranged Cradock at Coronel. And I do not go so far as to compare cruiser armament with capital ship armament, although, had von Spee mounted the same 8-inch guns which we are giving to our new *County* class cruisers, the issue of that fight would have been anything but a foregone conclusion.

Competition does not lead to considering how weapons are to be used. It unceasingly "goes one better." The materialist is always demanding ships and guns to beat the enemy —which simply means something bigger than anything the enemy has yet perpetrated.

CURRENT ARTICLES AND BOOKS

"Anti-Aircraft Spotting," by Captain C. E. Brand, in *The Coast Artillery Journal*, March, 1928.

"Recent Developments on Protection of Infantry Against Aircraft," by Lieutenant D. L. Hardee, in the *Infantry Journal*, March, 1928.

Naval Forces of the British Empire, Commander C. N. Robinson.

Foreign Navies, Captain E. Altham.

Comparative Naval Strength, Editors.

The Distribution of the World's Fleets, Editors.

The Geneva Conference, 1927, Captain A. C. Dewar.

French Naval Policy, Captain Paul Chack, French Navy.

The Naval Situation in the Pacific, Lieutenant Commander C. A. Tinker, U.S.N.R.

Some Reflections on Worship Designs, Admiral Sir D. R. L. Nicholson, R.N.

The Battle of Jutland, Fact Versus Fiction, Rear Admiral J. E. T. Harper.

Flying Boats in Empire Defense and Communication, Major P. L. Holmes.

The Electric Propulsion of Ships, Alfred Regnauld.

NOTES ON INTERNATIONAL AFFAIRS

FROM MARCH 3 TO APRIL 3

PREPARED BY PROFESSOR ALLAN WESTCOTT, U. S. NAVAL ACADEMY

UNITED STATES AND LATIN AMERICA

NICARAGUA ELECTION DECREE.—Following the defeat in February of the original bill providing for United States supervision of the October presidential elections in Nicaragua, a new bill was prepared with the approval of the United States Department of State and Brigadier General Frank R. McCoy, the United States Commissioner in charge of the proposed supervision. This bill passed the Nicaragua Senate March 7, but was defeated in the House of Deputies by a vote of 23 to 17 as a result of conservation opposition led by ex-President Chamorro. Thereupon President Diaz issued a decree putting into force the measures embodied in the bill. It was believed that in so doing he was not exceeding his constitutional powers. The decree puts supervision in the hands of an electoral board of three members, consisting of General McCoy, chairman, a Liberal, and a Conservative. No action of the board is valid without the approval of the chairman.

American news from Nicaragua was enlivened in March by an account in the New York *Nation* of an interview between its correspondent, Carleton Beale, and the rebel leader Sandino. Beale found Sandino's camp in the Yali range and secured a statement of his "demands," which included complete withdrawal of American forces and choice of an "impartial civilian president."

END OF MEXICAN OIL DISPUTE.—What was hailed as the conclusion of a ten-year controversy came on March 27, when President Calles signed new regulations for enforcement of the Mexican Oil Law, which had the effect of removing any retroactive or confiscatory application to American rights acquired before May 1, 1917. Confirmation of titles is still required, but this confirmation is without time limitation, instead of for fifty years. The new regulations are in line with the recent Mexican Supreme Court decision in favor of American oil interests.

President Calles' action gave conclusive evidence of Ambassador Dwight L. Morrow's success in establishing friendly and cordial relations with Mexico, to which not a little has been contributed also by the "good will flight" of Colonel Lindbergh.

NICARAGUAN CANAL SURVEY.—At the close of March it was stated that the Senate Interoceanic Canals Committee, of which Senator Edge is chairman, would report favorably on the Edge Resolution requesting that the Secretary of War be directed to bring up to date, at a cost of $500,000, the Walker Surveys of 1901 covering the proposed Nicaragua Canal. The committee also had under consideration Senator McKellar's bill creating a Nicaragua Canal Commission to spend $10,000,000 in survey work, and authorizing construction of a canal to be financed by a bond issue of $200,000,000. In 1923 the War Department estimated the total cost of the canal at $1,000,000,000.

PAN-AMERICAN CONFERENCES.—According to a statement issued by Director General Leo S. Rowe of the Pan-American Union, there are to be within the next year or so no less than fourteen special Pan-American conferences as an outcome of the

recent general conference at Havana. These include a congress of journalists, a fourth commercial conference, a Pan-American pedagogic conference, a conference on "plant and animal sanitary control," conferences on trade marks, on establishing steamship lines and elimination of port formalities, on agricultural coöperation, a women's conference, and provision for future sessions of the International Commission of jurists, which met at Rio de Janeiro last summer. Apparently suspicions and antipathies will be overcome, if it can be accomplished by conferences.

RENUNCIATION OF WAR

SECRETARY KELLOGG EXPLAINS AMERICAN AIMS.—In a speech before the Council on Foreign Relations in New York on March 15, Secretary Kellogg took occasion to review recent negotiations with France for arbitration and anti-war treaties, and to set forth more clearly the policies of his department. He defended, as in his recent note to France, the American objection to limiting a renunciation of war by any qualifying phrase, such as "aggressive war," and he again cited the recent Havana resolution condemning "war as an instrument of national policy," as showing that members of the League of Nations might feel free to sign such a resolution, since at Havana seventeen members of the League actually did so. Secretary Kellogg added, however, that the United States would never sign an agreement "to obligate itself in advance to use its armed forces against any other nation in the world."

FRENCH REPLY TO KELLOGG PROPOSALS.—In Europe, and especially in France, much interest was shown in Secretary Kellogg's New York address as throwing possible light on his recent suggestion of an "unqualified, multilateral treaty renouncing war." In the course of the month, and after consultation with diplomats of other nations, the French Foreign Office reached the conclusion that it would be quite possible to reply favorably to this proposal, on the assumption that the United States would not in such a treaty actually wish to go so far as to renounce war under all circumstances, as for instance to withdraw the element of force back of the Monroe Doctrine or to consent to arbitration of issues arising under it.

Accordingly in his reply at the close of March, Foreign Minister Briand declared that France was ready, "for the purpose of finding a common basis for initial negotiations," to suggest immediately to Germany, Great Britain, Italy, and Japan that "they join in seeking, in the spirit and in the letter of the last American note, any adjustments which in the last analysis may be forthcoming with respect to the possibility of reconciling previous obligations with the terms of the contemplated new treaty." Three points, however, were laid down as essential to any universal agreement:

> Admission to participation in the treaty of all governments of the world and complete equality in the application of the treaty to all the governments with respect to each other; the treaty to go in force only on receiving universal acceptance, unless the powers having signed should agree on its coming into force despite certain abstentions.
>
> In order "not to turn an instrument of progress and peace into a means of oppression" all signatories should be released from their obligations with respect to any one of the signatory nations failing to keep the agreement.
>
> Renunciation of war proclaimed under the proposed treaty would not deprive the signatories of the right of "legitimate defense" within the framework of existing treaties.

Quite obviously Secretary Kellogg's proposal ignores the League of Nations, and also leaves out of consideration any scheme of joint action in case war occurs. The actual feeling of European powers toward such an attitude is suggested by Lord Cushendun's bitter condemnation of the Soviet Government for similar disregard of the League in its proposals at Geneva.

LEAGUE CONFERENCES

MARCH MEETING OF COUNCIL.—The League of Nations Council ended its forty-ninth session at Geneva on March 10 after a troubled meeting at which little was accomplished. Nothing could be done about the perpetual Lithuano-Polish crisis because Premier Valdemaris of Lithuania refused to appear to explain his shortcomings. In regard to the shipment of machine guns from Italy to Hungary, an investigation was decided upon, and this was hailed as a favorable precedent establishing the rights of the League. In the long-standing dispute between Rumania and Hungary over adjustment of the claims of some 400 Hungarian land-owners in territory now held by Rumania, it was proposed to add two neutrals to the committee investigating

the matter and to call upon both nations to accept the decision of the committee to be rendered at the June session. The Secretariat of the League was authorized to let contracts for a $4,000,000 League building at Geneva.

Letters were sent to both Spain and Brazil requesting them to reconsider their decisions to withdraw from the League. From Brazil, press reports suggested an unfavorable reply, but Spain signified officially her intention to return within the League fold, as the best means of securing a position of political leadership among the Spanish speaking nations.

SOVIET DISARMAMENT SCHEMES.—The Preparatory Commission for a Disarmament Conference adjourned on March 24 after a stormy ten-day session in which the commission spent its time chiefly in efforts to prevent the "tri-power bloc" of Germany, Russia and Turkey from pushing it into a hole over the Soviet proposals for "radical and immediate disarmament." Obviously the three states named would gain immensely in relative military strength by adoption of such measures. For a while the situation was awkward, for the German delegate, former ambassador Bernstorff, insisted it was time something definite should be done. At last on March 20 the British delegate, Lord Cushendun, in an eloquent speech an hour and a half long, riddled the Soviet scheme. He accused the Soviets of insincerity, since they had never ceased their avowed methods of provoking disorder in other lands. He declared the Soviets were not present to give genuine assistance, and accused them of a "fixed purpose of boycotting the League and all its works." Much joy was felt by the twenty-two out of twenty-five delegates who opposed the Soviet plan. The Belgian delegate expressed the general sentiment when he said, "An olive branch is brandished over our heads in such a way as to resemble a cudgel rather than an emblem of peace. Hatred for our civilization is behind this project."

On March 21 Chairman Gibson of the American delegation also condemned the Russian proposals on the ground that they were "totally irreconcilable with the draft which is the basis of our discussions," and also on the ground that his government did not regard immediate and complete disarmament as calculated to remove the danger of war.

All that the session actually accomplished was to adopt the Security Committee's report with its draft pacts of non-aggression and mutual assistance, which were referred to the governments for consideration. The German resolutions for speeding a general conference, and for full publication of armaments each year in the League annual, were also referred to the governments without action by the commission. The adjournment was made "until the chairman finds that the governments have settled their differences on the question of naval disarmament."

BRITISH NAVAL PROPOSALS.—At the close of the Preparatory Conference the British delegation renewed its efforts for naval limitation along British lines by sending to the American, French, and Japanese delegations a scheme of limitations which was practically that presented at the unsuccessful three-power conference last year. It included: (1) Reduction of future battleships from 35,000 tons to something under 30,000 tons; (2) Reduction of battleship guns to 13.5 inches; (3) Extension of the accepted life of capital ships from twenty to twenty-six years.

GERMANY AND NORTHERN EUROPE

REICHSTAG ELECTIONS IN MAY.—Marked gains for the parties of the Left, and a shift from Nationalists to Socialists as a basis for the next German cabinet, were predicted as the outcome of the Reichstag elections in Germany scheduled for May 20. The last Reichstag, elected in December, 1924, was dissolved on March 31 after passing the budget.

POLISH-GERMAN TRADE PARLEYS SUSPENDED.—Disagreement over the rights of Germans in former German territory now a part of Poland caused on March 19 an indefinite suspension of trade treaty negotiations between the two countries. It was the German demand that Germans in Polish territory should be allowed to manage their lands and carry on industrial pursuits without interference, and this was made a condition to any agreement over trade.

PILSUDSKI GAINS IN POLISH ELECTIONS.—Results of the May parliamentary elections in Poland were complicated by the

competition of no less than thirty-two parties. It was estimated however, that, partly by strong-arm methods, the Pilsudski supporters in the new Sejm (Chamber) were twice as many as any other group, and nearly one-third of the total; while in the Senate their representation was still stronger. In spite of confused politics, Poland under her dictatorship has made notable progress in agriculture and industry, with a comfortable surplus of receipts over expenditures at the close of the last fiscal year.

DISLOYALTY IN GERMAN NAVY.—In Reichstag Committee discussion of naval estimates early in March General Groener, Minister of Defense, described efforts of reactionary organizations in Germany, and especially the so-called Viking League, to undermine the loyalty of the Navy to the Republic. The minister said it was his purpose to "sweep the Navy clean" of officers affiliated with these societies. In regard to the Imperial Yacht Club at Kiel, which had refused to substitute the word *German* for *Imperial*, he would regard it inexpedient for officers to retain membership.

FRANCE AND SOUTHERN EUROPE

TANGIER AGREEMENT.—Preliminary conversations between France and Spain over Tangier ended on March 3 in an agreement by which France consented to somewhat increased Spanish police control of the Tangier area as a means of preventing arms smuggling into the Spanish zone in Morocco. As a means of securing the consent of Great Britain and Italy to these arrangements, a conference of the four powers was scheduled to convene in Paris in the latter part of March. The United States sent a note to these powers on March 6, stating that while our government had "no political interest" in Morocco it had a fundamental interest in maintaining the open door and protection of its citizens, and presumed that nothing would be done by the conferring powers to interfere with these principles and rights.

FRANCE AND ITALY.—Conversations between France and Italy at the recent League Council meeting brought closer the possibility of a friendly composition of difficulties between the two powers. The proposed concessions to Italy would include (1) a larger share in Tangier administration and increased privileges to Italian residents, and (2) cession of certain bases in the hinterland of Tripoli as trading bases. In return Italy would be asked to refrain from pretentions to leadership in the Balkans. England, working with France to secure Italian friendship, would assure supplies of raw materials, such as iron, coal, fertilizers, and oil, essential to Italian industry.

MUSSOLINI BANS CHURCH TRAINING OF YOUTH.—At the close of March the Fascist Cabinet Council took a further step against non-Fascist training of youth in Italy by approving a measure to suppress all such institutions, and directed especially against the Catholic Boy Scouts, which hitherto have been tolerated in towns of more than 20,000 inhabitants. All physical and moral training will hereafter be in the hands of the Balilla, operated by Fascisti.

ENGLAND IN THE NEAR EAST

EGYPTIAN TREATY REJECTED.—Early in March the Egyptian Premier Sarwat Pasha presented to the Egyptian Parliament the new treaty with Great Britain which had been under negotiation for some months and which slightly relaxed British control of Egyptian affairs while retaining full British rule in the Sudan. This the parliament rejected, whereupon Sarwat resigned. The British then consented to the formation of an "experimental cabinet" by the majority leader, Nahass Pasha, successor of Zaghlul as head of the Wafd or Nationalist Party. In a note on March 7 the British Foreign Office declared it was not ready to go further than the terms of the treaty towards granting Egypt a fuller measure of independence.

DIFFICULTIES IN ARABIA.—Trouble over the Egyptian treaty was coincident with sudden threats of hostilities between the British and Sultan Ibn Saud, of Arabia, who was reported from Jerusalem to be countenancing Arab raids across the Irak and Transjordania frontiers. Possibilities of a "holy war," however, receded when reports came from Ibn Saud's representative in Cairo that the Sultan had no intention of making war on the British protectorates, and was doing his best to restrain his followers. Officials in England declared the Sultan was chiefly interested in a renewal of the $300,000 an-

nual subsidy paid to him by England during the war.

As Sultan of Nejd Ibn Saud refused during the World War to take part in hostilities against Turkey, but accepted a British subsidy to remain neutral. Later, in 1924, he overthrew the King of Hedjaz and became chief ruler in Arabia.

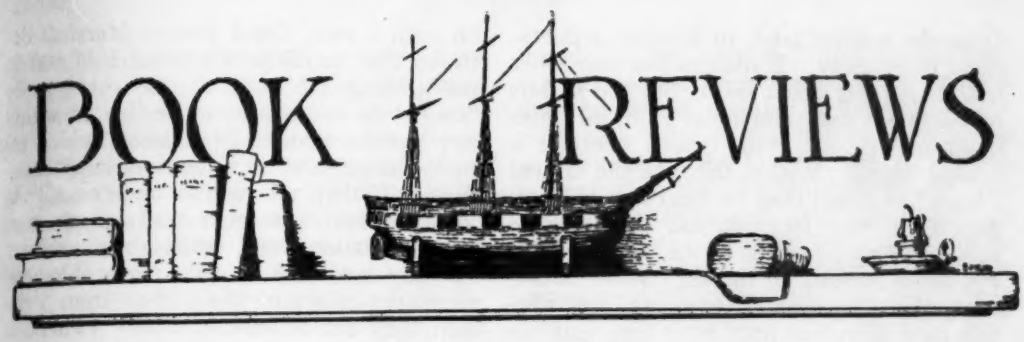
A full account of recent affairs in the Near East appeared in a publication of the Foreign Policy Association Information Service for March 2, entitled "Political and Economic Trends in the Near East, 1927."

REGULATION OF SEA WARFARE

NEUTRAL RIGHTS AND MARITIME LAW.—Under this title the Foreign Policy Information Service published in its issue of March 16, 1928, a useful review of the laws of sea warfare, as affected especially by the World War. The discussion includes a brief summary of principles accepted before the war, and the modifications proposed in the Declaration of London in 1909. It then takes up: (1) the Law of Contraband, pointing out that the distinction between absolute and conditional contraband was broken down during the war, largely because the distinction between combatants and non-combatants was itself almost lost; (2) the Law of Blockade, including the American protests against British practice and their subsequent acceptance of this practice; and (3) the Laws of Seizure and Confiscation. The study contains nothing new, but it is fairly unprejudiced and has a useful bibliography. It ends by suggesting the following questions which would have to be considered in attempting to formulate accepted principles:

> What is the status of neutral rights today? What is the extent of belligerent rights? How far is the international law of blockade different from what it was in 1914? Was international law modified during the war, or were the alleged modifications really violations? If a neutral is unable, or unwilling, to fight to prevent inroads on its neutral rights by one belligerent, has the other belligerent a right of retaliation? If so, against whom is there a right to retaliate? Against the neutral? Or is it against the belligerent enemy with incidental damage to neutral rights? Are the rights of belligerents to be stated in terms of means or of ends? For example, is the right of blockade a right to prevent ingress or egress of all vessels to the enemy coast? . . . .
>
> Both Germany and the Allies seem to maintain the theory that if a neutral is too weak or too pacifically inclined to prevent a violation of its neutral rights by one belligerent, the other belligerent has a right of retaliation which, though directed against his opponent, may infringe neutral rights.
>
> The German measures, involving as they did the loss of life of non-combatants, were almost universally condemned. No one seriously maintained that the breach of the law had brought about a change in the rule.
>
> The Allied measures, however, were somewhat different. They inflicted only loss of property on neutrals and the nations of the world did not join in condemning them. Moreover, the Allies successfully maintained their measures as long as the war lasted and even since the war their measures have found defenders.
>
> Any conference meeting to restate and recodify the rules of maritime law will find itself divided on a fundamental issue: Should it be a law-making conference? Should it merely restate the laws as they exist or should it attempt to remake the laws? Should its function be declaratory or legislative?

PROHIBITION OF MUNITION EXPORTS.—Representatives of both the United States War and Navy Departments appeared before the House Foreign Affairs Committee in the latter part of March to express their objections to the Burton Bill which would prohibit export of war munitions from the United States to any belligerent nation. Colonel Robbins, Assistant Secretary of War, pointed out that it would be practically impossible to distinguish between munitions and other exports such as steel products, cotton, starch, nitrates, chemicals of all kinds, and motorized machinery. He argued that the measure would not only hamper our own national defense by cutting down munition plants, but would force every country to develop its own means of supply.



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THE LAW OF TERRITORIAL WATERS AND MARITIME JURISDICTION. By Philip C. Jessup, LL.B., Ph.D. G. A. Jennings Co., Inc., New York, 1927. $9.00.

REVIEWED BY REAR ADMIRAL W. L. RODGERS, *U. S. Navy (Retired).*

A most instructive work: The preface opens with the statement that "The liquor smuggling along the American coasts . . . . has created a problem involving every aspect of the law of territorial waters." It seems to be the chief object of the book to ascertain how the Prohibition Amendment to the Constitution and the legislative enactments and treaties made in its support, have affected the development of this branch of international law. As a basis for his study of changes thus originated the author reviews the previous status of the law in all its aspects.

He states that he rests his study on the dictum of the Supreme Court that in ascertaining a rule of international law the Court resorts to "the customs and usages of civilized nations, and as evidence of these, the works of jurists and commentators who . . . . have made themselves particularly well acquainted with the subjects of which they treat." Nevertheless, although the author disavows the belief that writers are able themselves to make international law, yet it seems that in some instances he is inclined to give more authority to their statements of international law than that of mere surveyors of evidence.

The book starts by showing that the extent of territorial waters subject to complete national sovereignty is three miles from shore. Although some countries have endeavored to deny that international law compels respect for the three-mile rule, it is, nevertheless, well established. There are some exceptions to the general rule. It is a question how far estuaries, bays and openings between headlands may be considered inland waters. A large part of the book is devoted to the data on each of the most important bays whose control is disputed. The conclusion is that waters within headlands approaching each other within six miles and belonging to a single state are undoubtedly inland waters. There is also a tendency to admit as inland waters those bays whose headlands are as much as ten miles apart. Beyond this limit there are bays whose headlands are over ten miles apart over which exclusive territorial jurisdiction is claimed; such as Delaware Bay in this country. Where this claim has been long maintained without opposition or denial by other states, it must undoubtedly be recognized as a prescriptive right.

The writer does not allude to an interesting case in which the United States has maintained, without opposition, a still greater extension of territorial waters which is of importance to seamen. Pursuant to a law of February 19, 1895, the United States has declared that the "U. S. Rules for Inland Navigation" apply to waters inside a line drawn from one off-shore light-house to another lying along the coasts of the United States at a considerable distance beyond the three-mile limit. Thus, off Penobscot Bay on the coast of Maine, the line runs from Mount Desert Rock twelve miles

from the nearest land, to Matinicus thirty-three miles away. Matinicus lies near other islands not far from shore, but the middle of the line is over nine miles from the outer point of Isle au Haut, which itself is a coastal island. Within this line the United States has substituted its local law of navigation for the International Rule of the Road which binds ships of the United States and other nations on the high seas. Moreover, this extension of territorial jurisdiction over what was previously high seas has been recognized by England and France in their governmental "Sailing Directions" issued for the guidance of their ships and navigators. The French "Instructions Nautiques" and the British "United States Pilot" both accept the lines declared by the American proclamation. The matter is one of importance to courts and to seamen in case of collision within that area. Moreover, the reviewer has been orally informed that the Coast Guard takes the line of the proclamation as the datum line from which it measures to seaward the three-mile and twelve-mile limits to its activities under the laws of the United States.

After establishing that three miles is to be taken as the limit within which national sovereignty may be exercised and that all beyond is "high seas," the author considers the question of the exercise of authority upon the high seas and shows that it is frequently convenient to exercise at least a partial control. Upon what matters exclusive national jurisdiction may be exerted beyond the three-mile limit, and how far in space that jurisdiction may extend, has been worked out by claims and counterclaims through many years, and the successive steps indicate that international law is not a rule of compelling moral force, but is a matter of comity, where usage has crystallized into rules which are now so far recognized as valid that their violation is cause of offense. In a number of cases treaties have accepted and embodied the customary practice, and so have given added weight to usage.

Thus there are admitted exceptions to the rule that the high seas are free to all. First, there is the belligerent right of visit and search. It seems hard to deny that there are somewhat analogous rights in time of peace. A chief instance is in regard to customs jurisdiction and control. In a decision on such a case, Chief Justice Marshall declared that the Supreme Court held that in maintaining the laws of the country the "means do not appear to be limited within any certain marked boundaries which remain the same at all times, and in all situations. If they are such as unnecessarily to vex and harass foreign lawful commerce, foreign nations will resist their exercise. If they are such as are reasonable, and necessary to secure their laws from violation, they will be submitted to." [This declaration of the Chief Justice puts clearly the basis of international law as one of custom and mutual consideration, arising out of international good manners, but not entailing obloquy for infringement.] Conformably to the above principle, the United States has enacted laws extending the right of visit and search in support of its customs laws to twelve miles from the shore and no nation has raised objection. Other nations have taken action more or less similar. A state may take measures on the high seas designed to guarantee its safety, such as the French conditions and supervision as to the action between the *Kearsarge* and *Alabama*. There is also the right of "hot pursuit" into the high seas for offenses committed within territorial waters.

But nevertheless, there is much reluctance among governments formally to admit that the exercise of national authority over other flags on the high seas is of right.

The passage of the Prohibition Amendment and its sustaining legislation brought rum runners to hover on our coasts. Their consequent seizure, together with the lack of precision as to the extent of the national authority over foreign flags outside the three-mile limit, led to protests from foreign governments and these again resulted after some years in a series of treaties whose purpose on the part of the United States was to facilitate the execution of our laws without arousing friction with foreign powers. The first and most important of these treaties was that with Great Britain, for most of the foreign smugglers bore her flag. The writer takes up the legal questions arising out of the seizure of rum-runners and their attendant shore-boats and indicates how the treaties aided the United States. But while he traces the legal side very fully, he does not fully bring out the political object which seems to have actuated Great

Britain in making the treaty. In fact, he alludes to the political side of the negotiations only to quote Lord Curzon's charge against this country that the government was putting pressure on British shipping in order to induce Great Britain to control the traffic in contraband liquor from British territory; whereas the political struggle resulting in a treaty was a victory for England. For by the treaty England handicapped the development of the American merchant fleet in favor of her own, upon which she relies for her prosperity even more than before the war.

When the prohibition laws first became operative, two international questions arose, namely, the right to seize foreign rum-runners outside the three-mile limit of territorial waters and the right of foreign ships to bring liquor under seal into the ports of the United States. At first, foreign ships were allowed this privilege, but a court decision as to liquor transportation within the United States caused the Treasury to terminate the privilege after June 10, 1923, and thus foreign ships were put on an equality in this respect with American ships competing with them for passenger business. In the meantime, ever since the passage of the prohibition laws, foreign liquor smugglers, mostly British, had been hovering on the coast; some of them with fraudulent papers of British origin, issued with connivance of British authority in British territory. (Letter of Secretary of State in case of ship *Henry M. Marshall.*) When they were seized, the British Embassy protested against interference with British ships on the high seas. The United States replied that the power of the United States to protect it own laws gave it jurisdiction beyond the three-mile limit. In the case of the *Grace and Ruby,* seized outside territorial waters, the court ruled that it was a political matter for the political departments of the government to decide how far the authority of the United States should extend. Thus our courts upheld seizures on the high seas, and proclaimed the right of the political departments of the government to establish and maintain if they could a disputed point in international law.

The British government in general terms assured the Department of State of its desire to aid the United States in carrying out its laws, but when the Foreign Office protested that the *Grace and Ruby* was improperly seized, the Secretary of State retorted that the protest was not in accord with the professed desire of the British government to aid that of the United States. It was evident that the British government was without justifiable ground of complaint. It does not appear, however, that the American Secretary of State took advantage of this opportunity to suggest that the British government could avoid friction by itself seizing British smugglers hovering on our coasts. While the British government was thus diplomatically supporting the smugglers, the Treasury order that foreign ships could no longer bring liquor under seal into American ports introduced a marked change into the diplomatic situation. Foreign steamship companies brought the order into court. The companies pointed out that some countries required their ships to carry liquor both for crews and passengers. There was thus a conflict of laws. Still, it was generally conceded that the United States had the superior right of control, but the companies urged that international comity demanded leniency in the exercise of that right. The Court upheld the Treasury.

The decision gave the American government bargaining power to force the British and others to consent to the exercise of American authority beyond the three-mile limit. It was important for foreign shipping to handicap as much as possible the newly developing American shipping engaged in foreign commerce and the advantage to be derived from furnishing liquor to passengers was not to be neglected. The unreasonable and unfriendly stand of foreign governments in regard to the seizures of their hovering smugglers had to be forsaken to retain a substantial benefit to their shipping. Consequently a treaty with England was made and ratified in 1924 whereby the British government agreed to "raise no objection to the boarding of private vessels under the British flag outside the limits of territorial waters by the authorities of the United States" within an hour's run of the territorial waters. In return for this concession which it was scarcely friendly to refuse in any case, the British obtained the great commercial privilege that "no penalty or forfeiture under the laws of the United States shall be applicable to the carriage of alcoholic liquor or to vessels or persons by

reason of the carriage of such liquors when such liquors are listed as sea stores or cargo destined to a port foreign to the United States, ... provided that such liquors shall be kept continuously under seal while the vessel on which they are carried remains within said territorial waters." Similar treaties were subsequently made with other countries.

Mr. Jessup discusses the constitutionality of this group of treaties. The Supreme Court has not yet passed on this point, but he believes that an ambiguity in the language of the Amendment makes it easy for the Court to affirm the treaties if one comes before the Court; and, moreover, as he points out it is the general policy of the Supreme Court to support as far as possible the constitutionality of executive and legislative acts rather than to overthrow them. It is an interesting point that in order to reach a satisfactory agreement in the treaties, the two parties each consent not to uphold what it regards as the general law upon a particular point of difference. The British make no objection to seizures which they declare are really unwarranted, and the Americans will not apply the general penalties to British vessels bringing in liquor under seal. The British treaty follows the phraseology of the American law permitting the transit of liquor through the Panama Canal, which is arranged for by the simple device of saying that no penalty will be applicable in the Canal Zone. Where the courts have no penalty to inflict it follows that their dicta are negligible if uttered and therefore appeal to the law, in this case the Constitution, is useless. Thus the treaties which are the most recent developments in the international law of territorial waters have been utilized by the foreigners to handicap American shipping in its effort to aid American manufactures in the markets of the world.

It should be said, in conclusion, that the book is a complete study of the subject, clearly written, with many notes and references to treaties and court records and well worthy to be placed on the ships' libraries of the Navy Department.

NAVIES AND NATIONS.

By Hector C. Bywater; Boston, Houghton Mifflin Company, 1927, $4.00.

That the seas should be equally free and safe for the use of all people, under rules set up by common agreement and consent, and that, so far as practicable, they should be accessible on equal terms.

That national armaments should be limited to the necessities of national order and domestic safety.

—Woodrow Wilson, Second Inaugural

The adjournment *sine die* of the Geneva Tripartite Naval Conference this summer, closing as it did the fifth year of operation of the Washington Treaty, marks the failure of the first real attempt to extend the letter and spirit of that treaty to all classes of combatant vessels. It is, as yet, far too soon to appreciate the full significance of that failure, but it seems clear that it has brought the maritime nations of the world face to face with a problem of deep import; a problem that has not so much arisen out of the failure as it has been rendered crucial by it. Wherever one may place the blame for resuming naval construction after 1922, if blame there is to place, it is undeniable that today England and America have taken the lead. In England, where age and wear are rapidly depleting a fleet of war-built auxiliaries, energetic steps are being taken to replace it with a force of modern and powerful ships. In the United States, a steadily growing demand for new construction to fill out a navy left woefully weak in cruisers by an ill-advised policy of emphasizing capital ships, has already been partially answered, and there is every indication of an intention on the part of the government to further respond. What has happened—and is happening—in these two countries has happened the world over. As the world has entered an era of world development, as the emphasis has passed from the continent of Europe to the world at large the oceans have become links and not barriers. As a result, sea power has become of vital importance. In the absence of other means of protection, the maritime nations have been forced to strengthen their naval forces to protect their national interests. Nearly every nation has expressed its willingness to adhere to an international agreement for the limitation of armaments, provided that the other nations all join, or that national security is preserved in some other way. As yet, no practical means of guaranteeing that security has been found. The problem in its broader aspect is to find the way to settle national grievances without force, while national interests are protected; in its

narrow and more immediate aspect, it is to prevent the inauguration of a naval construction race, and to limit naval forces only to a point consistent with national security. Upon the acknowledged leaders in naval power has devolved by international agreement the joint guardianship of the freedom of the seas. Those leaders today are on the verge of naval rivalry, a course of doubtful value and great potential danger, and one that is sure to force the other maritime nations to augment their naval strength. It rests with England and America to make the choice between the old well-trodden road to war, and that new highway leading toward a goal that must be, however unattainable it may seem to us today, the ultimate goal of civilization.

At a most timely moment Mr. Bywater has published a keenly critical analysis of naval affairs since the World War. The appearance of this study of naval developments and tendencies at a time when public interest in naval affairs has been so aroused is most opportune. Mr. Bywater is a naval author of accepted rank. His books on postwar naval strategy in the Pacific, his frequent commentaries on current naval questions, and his authoritative discussions of tactical and strategical problems are widely read and highly valued. Even more does he represent a liberal school of thought in England, one that tends to be free of the restrictions of professional thought. But he is well schooled in the naval point of view, and whatever interest his books may contain for the layman, they are certain to prove of great worth to the naval student.

With a definite aim in view, Mr. Bywater has presented an able résumé of the postwar naval years. While he has here discussed in no little detail the naval affairs of every maritime state of importance, he has devoted his book chiefly to a frank consideration of the influence of the naval situation upon Anglo-American relations. "In the belief," as he himself writes, "that candor is the surest antidote to misrepresentation," he has sought to examine the problems and policies of both nations in the clear light of impartial criticism. He has presented England's case more frankly than many an outsider could do, and with an insight into the workings of the English mind that no foreigner could give. True, there are many of the old arguments that one has heard so much of these past months, but they are presented from a new point of view, and in their true light. Perhaps the most striking aspect of their presentation is the relation shown between these reasons for the British navy and the interests of the world at large. However he has made it clear that in the last analysis England's life depends upon the freedom of the seas, or, as he puts it, the safety of her trade. The author has never lost sight of the fact that England is but one nation of many, however great her maritime interests are.

Mr. Bywater has written of the English navy from an English point of view, albeit a new one. He writes of the American Navy from that same point of view, but not, as many would think, as an Englishman. His treatment of our own naval problems is illuminating as an impartial and critical appreciation of our situation. He has sought not to compare but to discuss. His views of American naval requirements are soundly based on facts that it would be difficult to refute. With his conclusions regarding the strength and effectiveness of the Navy some may be inclined to disagree. Certainly, in one case, he inconsistently states our old armored cruisers to be of little value for convoy duty, while in writing of the Japanese navy he considers their seven ships of a like type to be very useful for this service. But this is, after all, a mere detail, and much of a matter of opinion. On the whole, this keen analysis of our own situation is of great value. We cannot hope to find the correct solution to our problems unless we thoroughly understand the questions involved. Impartial criticism is a definite aid to such an understanding, not only for the view it presents, but for the discussion it promotes as well. It is admitted that there are many points that are open to debate, but the very fact that those points may be put in issue makes an able presentation of them the more valuable.

Naturally enough, for it is indeed the crux of the matter, the Washington Naval Limitations Treaty is considered at length. But here Mr. Bywater has failed to go deeply enough into his subject. Regarding the treaty as a *fait accompli*, he has neglected to inquire into or explain the reasons for its inception. In considering the spirit of the treaty he has devoted himself purely to an interpretation of the letter of the document. His treatment of the subject is most certainly valuable as far as it goes, but it seems

to me that the author has failed to go far enough, to make clear a point that is fundamental to a clear understanding of the problems arising out of that treaty. Those statesmen that met at Washington on the day following Armistice Day in 1921 were not there primarily to limit the naval forces of the countries there represented. They had met because the threat of a renewed competition in armaments, of a new naval rivalry hung over the world, because the world had had its fill of such. "I can speak officially only for the United States." Said President Harding, on that day, "Our hundred millions frankly want less of armament and *none of war.*" (The italics are mine.) They were there to seek success where Versailles had seemed to find failure. Because sea power had become so vital a factor, they sought to curb its exercise, as the surest way to negative the threat against a peace so hardly won. As a means of gaining this end—of curbing sea power, and preventing war—they evolved the principle of joint guardianship, and the consequent rule of naval ratios. But the underlying question was—and is—one of international law, not of naval strategy.

The Washington Treaty imposed upon England and America the trust of joint guardianship of sea power.

> It was this peaceful passing of naval dominance, or, to express it more accurately, this turning over of dominance, to, so to speak, a board of trustees, making it no longer a prize of selfishness to be contended for by jealous nations, but rather a coöperative responsibility to be administered jointly, that made the Washington conference "unique in history."[1]

The Conference did this thing because it was realized that the freedom of the seas was essential to world peace. It was a step toward solution of the great problem, for it sought to erase one reason for maintaining armaments by guaranteeing the security of the interests the armaments were designed to protect. The underlying principle of the treaty was joint interest and not naval equality. As a means of carrying that principle into effect, of establishing the trust, the rule of naval ratios was worked out and applied. With capital ships, whose values were well known, the suggested ratio fitted the case admirably, giving the two leading naval powers a parity in battleship strength, with the other three having proportionate forces. For some reason not easily explained the ratio was applied to aircraft carriers, possibly because their possibilities were great and their actual value in warfare unknown. It was not applied to auxiliary craft, primarily because the nations could not agree as to their respective needs, actually because it was unsuitable to the task. Each nation's share in the trust differs not so much in size as in scope. Britain has accepted equality of naval strength with the United States, not a specific equality of gun for gun and ship for ship, but substantial equality. It is indisputable that England faces greatly dissimilar problems, problems whose requirements cannot be measured by the same test as ours. The principle remains the same, but its application must differ with each situation. The failure to realize this caused in great part the breakdown of negotiations at Geneva. So we are faced today with the problem of *limiting naval auxiliary strength* in accord with that principle of joint guardianship which the five foremost naval powers adhered to at Washington in 1922.

Taking his cue from Hughes's curt sentence, that "competition—in armaments—must stop," Mr. Bywater has sounded a clear warning against naval rivalry. And he has based his plea not on the grounds of idealism and philosophy but on the solid foundations of economic and historical truths. But it must not be thought that the book is devoted to propaganda for disarmament or peace. World peace is the ultimate goal of civilization, but that goal is the aim of national and not naval policy. So long as no better system is provided national security must be safeguarded by adequate armed forces. It is axiomatic that naval policy must be guided by the dictates of national policy. But while the chief aim of the latter undoubtedly may be to devise through international coöperation some system by which national security may be safeguarded without the maintenance of armed forces, the purpose of the former must be to preserve its strength so long as and to the extent that national security demands it. Mr. Bywater has indeed made a valuable contribution to the better understanding of this phase of international affairs, but the chief worth of his volume lies in his able consideration of the requirements of national security on the sea today. Applying both the tests of internal demands

[1] Sullivan, *The Great Adventure*, p. 285.

and external relations, he has here measured the existing, and proposed naval forces of the chief naval states. His conclusions are not always unassailable, but his reasoning is, I think, clearly sound. For he has gone beyond the narrow considerations of naval strategy and linked his case with the broad principles of international law and all the scope and play of those divergent influences that together result in what we call history. His book is more than a naval treatise, it is a scholarly dissertation on the relation of sea power to the world of today.

In his concluding chapter, Mr. Bywater has urged upon his own country the vital need of a change in naval policy. Calling attention to the fact that the question is not an isolated one that affects England alone, but rather one the answer to which is certain to influence the conduct of every naval power, he challenges his country to fulfill the pledges it made at Washington and to execute the trust it accepted there. The message is one that we in the United States might well take to heart, for we are faced with that problem no less than England. With us, it is easily stated. We have today a Navy that, measured by existing standards, is not of sufficient strength to meet the requirements of national safety. There are two courses open to us to remedy this situation. Obviously, we can build up to those requirements as we view them. Such a course is highly expensive, and is one that may well be looked upon with distrust by other nations, in the light of existing treaty obligations and official statements. The other course, one far better calculated to serve all interests, was first actually adopted at Washington in 1922. If by international agreement existing standards, which means, in the last analysis, comparative strength, can be lowered to fit our present status, we have reached our goal. This method may not be practical. But we have pledged ourselves to test it. The technicians attempted it at Geneva and failed, through no fault of theirs. I think that no one will assert that that failure was due to an unwillingness on the part of the nations represented to agree to call a halt in naval construction. Mr. Bywater has shown that there is no real reason why that construction should go on. The answer must be plain. Even as I write, England has postponed indefinitely the laying down of two more cruisers under this year's program. We can do no less than try again, before it is too late. A.R.H.

HOW TO MAKE CLIPPER SHIP MODELS. By Edward W. Hobbs, A.I.N.A. Brown, Son and Ferguson, Ltd., Glasgow, 1927. $2.50.

REVIEWED BY REAR ADMIRAL ELLIOT SNOW *(CC), U. S. Navy (Retired)*

The author of *Sailing Ships at a Glance*, Edward W. Hobbs, A.I.N.A., Vickers Gold Medalist, has joined recently the ranks of those who are moved to write about ships in miniature. He has chosen for his subject, *How to Make Clipper Ship Models.* About one-half of a 210-page manual is given over to a description of the modeling of the *Loch Torrens*, fourmasted bark-rigged clipper built in Glasgow by Barclay Civile and Company about 1881. His main subject is, therefore, one of the late derivations from the real clipper ships of the fifties.

The author leads up to a description of the task of making a model of that vessel—a complete one suitable for exhibition purposes—by giving attention first to a "water-line" model and then to a "scenic" one. The first named type—"A Water-line Model"—is generally a small model which represents a ship afloat seen from a distance. Hence it does not show the underwater body and does not rely, for effect, upon the correctness of details but it has to be fairly accurate as to general proportions and outline. The author's advice to the novice, to commence with a model of that type, is good, but to then pass on to a scenic one as an intermediate step is not advocated. A young beginner in the fascinating handicraft of ship modeling is less likely to become discouraged if he can produce, rather quickly, something he can show to his elders, or with which to "lord-it-over" his companions and playmates.

Scenic models are, in reality, sea pictures in relief and as a rule are housed in some kind of a glass case with a painted background, accompanied with simulation of waves, headlands and the like. These models are relatively simple and may be easily made from cardboard and other light materials. This is a form of art, which, if attempted by any one without imagination or who has not a real genius for choosing his subjects and skill in combining the ma-

terials as to present vividly and artistically that subject, is likely to result in very mediocre results. It is interesting to find a chapter in a book of this kind devoted to that branch of model making. The descriptions and suggestions made will be very helpful to anyone whose inclinations and tastes lead them into that fertile field. Details in full size from which to make a scenic model of the famous *Cutty Sark* are given on Plate six. In passing, it may perhaps interest some readers to know that some authentic views of this "tea clipper" are to be found in *The Return of the Cutty Sark* by C. Fox Smith (Lauriat and Company, Boston).

The chapters, which deal specifically with the modeling of the *Loch Torrens,* cover the ground well but some good opportunities to make the details fully complete have not been utilized. The list of material and tools required could easily have been given, and to advantage, in greater detail, with the information the author doubtless had at hand. Youngsters and others whose pocket-money is limited usually want and need very precise information on these points to produce a specific craft. The group of tools and some of the materials needed for the *Loch Torrens* are shown in a group view (Fig. 73), but a beginner in this sort of work could not gain a great deal of information from it. A few other illustrations err in this respect, but on the whole they are very informative.

The price of the book is moderate considering the kind and extent of the information it contains and the evident expense of its production, shown by the wealth of photographic reproductions. The illustrations number slightly more than two hundred, of which about seventy are reproductions of photographs showing manual operations. Very good instances of this are shown by Fig. 39, "Stretching the middle of the sail," and Fig. 74, "Using the spokeshave." The value of the book would have been very greatly enhanced if all of the photographs of manual operations had been taken, as in these two instances, from the point of view of the model maker, rather than from that of an interested on-looker. The book is such a good one in many respects it is to be regretted that the opportunity to make it an exceptional one was not grasped.

In addition to descriptive text, often accompanied by small undimensioned sketches, the book includes five plates of the *Loch Torrens:* an above water profile; the lines; masts, spars and running rigging; standing rigging, and deck fittings. A "pin-rail" plan like that given for the frigate *Constitution* in Volume I, No. 3, of the *Rhode Island Mariner,* would have been a splendid addition. For a complete exhibition model, too much detail cannot be given.

The closing chapter contains suggestions on "How to find the necessary data for the construction of any type of clipper ship," and ends with a very brief bibliography. It would not have been within the scope of the book to have enumerated all of the sources. The assignment of a chapter to that subject, however, would have permitted something more to be given. Two very important sources from our—the two great English speaking countries— point of view for clippers up to 1850-1860 were not mentioned. One of these is in England—The Macpherson Collection of Maritime Prints; one in the United States—The Clark Collection of Marine Prints. The latter is at the Massachusetts Institute of Technology; the former, a private one, is now on view in London. This latter may possibly be acquired before long by the new National Naval and Marine Museum, Queen Anne's house, Greenwich. Besides these collections there are a number of museums in England and the United States whose officials are only too ready to supply information and photographs of specific ships on request, but *How to Make Clipper Ship Models* did not and could not naturally cover the whole subject of "ship-lore."

Each book, like this one of Mr. Hobbs, which adds its distinct quota of special information about the subject of ship model making, should be welcomed by all who are interested in this sort of work. Ship model making dates back more than 5,000 years and will be continued as long as man ploughs the sea. It is well to have records of *How to Make Models of Clipper Ships* before the art is forgotten.

SECRETARY'S NOTES

Thirty Years Ago The country was at war, and though it seems absurd now, the country was hysterical. Calls were coming from Maine to Florida for ships to guard the coast against a phantom enemy, reported here, there and everywhere. We were not prepared. Efforts had been made at the last moment to correct our deficiencies and we had bought the cruisers *Albany* and *New Orleans,* and had even had a small torpedo boat shipped to us on the decks of a trans-Atlantic steamer. We had to get the special ammunition for the *Albany* and *New Orleans* from England. The fact that Spain was woefully weak was not known, but our own situation was at last realized. Where were the ships to guard the coast, where was the shipping needed to take our troops to Cuba?

On the first day of May the country was electrified by the news that Dewey had destroyed the Spanish Fleet in Manila Bay! It was the first evidence to a "jumpy" people that possibly our Navy could hold the enemy. It took "Santiago" to finally convince them.

But what about Dewey? True, he had defeated the enemy, but he had nearly exhausted his ammunition and the homeland was 6,000 miles away. Supplies had to be gotten by means of foreign shipping as our own was *nil.* Suppose it had not served the purposes of the foreign nations to supply this shipping?

We "muddled" through but our success was not due to any national foresight. Our success depended upon outside assistance.

Lesson number one!

Twenty Years Ago The Battle Fleet was on the cruise around the world. It was reaching San Francisco after an arduous trip around South America. The cruise had been made in the face of violent opposition, disasters had been predicted, the President had been bitterly criticized for allowing the cruise.

Again we were successful because of foreign shipping. The fleet was sustained by vessels chartered abroad! This was a peaceful cruise; what would have happened if it had been a war move? Would foreign nations have supplied the shipping? Not unless it served their purpose. Our success depended upon outside assistance.

Lesson number two!

Ten Years Ago The nation had entered the world's greatest war on the side of the allies. Our troops were being shipped overseas by the hundreds of thousands in order to save the day. And they were being shipped in foreign vessels, for we had none of our own. We paid and paid for the privilege of

using foreign ships. Men packed like sardines and the government paying the allies the regular passenger rate plus.

To this country was allotted the task of supplying the needed ships but time was vital. Build ships fast, regardless of quality. Steel ships, iron ships, wooden ships, concrete ships, anything that would float! If a ship would last for one trip it would have fulfilled its purpose! Spend one billion, two billions, spend any amount but get ships! Well, we got the ships and most of them were just able to limp across the ocean. We have them yet, some unable even to limp, others utterly unsuited to compete with the modern ships built by the allies after the war.

Warships—build as many as possible, spend billions if necessary. But warships have to have some stability and it takes time to build them. Our belated program was stopped and all construction activities devoted to the less complicated types. Enough money was spent in this way to have supported reasonable programs in the Navy and Merchant Marine through forty years. And at the end we had nothing.

Everyone seeking for easy ways of winning the war. The President appealing to enlisted men, to officers, to scientists to think up a new way to defeat the enemy. As though war is a game of tricks where sleight-of-hand overcomes common sense! Wars are won by hard blows from armies and navies equipped with the latest devices and trained to use them.

Billions spent in the hysteria of war where millions would have sufficed if reasonable programs had been followed in times of peace.

Our success due to allied shipping.

Lesson number three!

Today Ten years after the World War! Our shipping still rotting in our ports, unable to compete with modern foreign ships. Supremacy of the sea given away in one of the noblest gestures the world has ever seen. What have we gained? Are we in as good a position as we were when we gave away our six battleships and six battle-cruisers? Do other countries think as much of us as they did, say, in 1920? While we were giving away supremacy of the seas, other countries were making programs to extend their predominance in other types not limited by the Washington Treaty. When we try to get an agreement to stop this evasion of the purpose of the treaty, we are rebuffed.

Each ten years the lesson has been brought home to us. But we never seem to learn. Do we expect to be the darling of the gods always?

Other races and nations have thought themselves God's chosen people but where are they now?

A Naval Program On Business Lines It is a fair estimate when one says that in the World War this country spent five billion dollars on war vessels and merchant ships. Supposing that this country had put aside a building fund of five billion dollars, the interest of which was to be used in the building of men-of-war and supporting the Merchant Marine? At four per cent, over 200 million dollars would have been available each year for new construction, far more than has ever been appropriated except when the country was at war. And the principal would have been available in case of emergency. The Navy could have gone ahead with a definite program and have had a balanced fleet, new vessels replacing the old as they became obsolete; and the Merchant Marine could have been given substantial support.

As it is, the money has been spent but the same annual uncertainty as to the naval program exists.

The Fleet Arrives at San Francisco

Twenty years ago the fleet arrived in San Francisco. Originally the objective of the cruise, it now became what might be called the halfway mark. After a pleasant stay in the southern ports, the fleet concentrated in Monterey Bay. The *Ohio* and *Wisconsin* joined up, making eighteen battleships all told.

Admiral Evans, who had been trying to regain his health on shore, rejoined the fleet and the fleet got underway. On the morning of May 6, 1908, the eighteen battleships and six destroyers stood in through the Golden Gate. Just inside the Gate the fleet was joined by ten cruisers, the Pacific Fleet. This was the greatest concentration of United States men-of-war that had ever taken place up to that time. It was a beautiful as well as an impressive sight.

San Francisco was just beginning to recover from its disastrous earthquake and fire. But it took time off to give the fleet a rousing welcome. For days there was one function after the other.

Many saw San Francisco for the first time; Chinatown, the Barbary Coast, Seal Rocks, Mt. Talmapais, Oakland, Berkeley etc. Those who had time (and the money) took in Yosemite and the beautiful back country.

The time was all too short but the cruise must go on.

While in San Francisco, Admiral Evans hauled down his flag, after a most conspicuous career. It was fitting that his last command afloat should have been this mighty armada of well trained ships; that his last cruise should end so gloriously.

Classmates

In this issue we present two distinguished graduates of the Naval Academy. Mr. I. N. Hollis and Mr. M. E. Cooley were classmates and roommates at the Naval Academy. They have been more or less associated ever since graduation and their careers have been very similar. Both have distinguished themselves as educators. There is something about the atmosphere of the Academy that perpetuates friendships. Is it because loyalty is stressed?

In these modern days when it is the favorite indoor sport to belittle everything American, loyalty is a rare virtue.

The Truth Will Prevail

A little over one year ago naval officers were bitterly assailed because of their action of firing on the Chinese at Nanking when this action became imperative in order to save American lives. The usual line of attack was followed, Imperialistic America, downtrodden Chinese, etc. It does not matter what America does, it is all wrong.

It is noted in recent news dispatches that the commander of the Southern Chinese forces admits full responsibility for the Nanking outrage of March, 1927, has already executed fifty-one of the Chinese offenders and will execute the rest as he locates them. He will also make reparation for property losses (most of which goes to missionaries). The irresponsible utterings of incompetent people jeopardize the lives of our people abroad. Prompt, forceful action by our naval officers on the spot protects them.

Incidentally, this action by the Chinese commander leaves those Americans who so promptly repudiated their affidavits, once they were safely out of danger, in a rather unpleasant and ridiculous position.

The Legion in National Affairs

News item: "The American Legion weakens its position by passing resolutions that attempt to tell Congress what American policy in foreign relations should be. Its field of opportunity is great, and it should concentrate its efforts toward seeing that legislative and administrative justice is afforded the men who were willing to offer their lives in the great war."

Are we to infer from the above that foreign policies should be left to the pacifists, draft-evaders, conscientious objectors and profiteers who stayed at home?

Policies are what bring on wars. Conflict of interests—war. When nations project their policies so as to interfere with the affairs of other nations, then everyone had better look to their armed forces, for war is very apt to result.

What would have been the result, ten years ago, if our soldiers had been told that they were to consider themselves no longer qualified to carry on the duties of citizenship? And what is so important to the nation as its foreign policies? Foreign policies and the national defense are inseparable.

Ten years ago five million men, the flower of our manhood, took up arms in defense of our national policies. Untrained, they were thrown into the maelstrom of war. They were the victims of a policy of unpreparedness. Thousands were sacrificed to this futile policy, and those men who returned have some very definite ideas on the subject.

Ten years have elapsed since the war and these men are now in a position to prevent a repetition of such a condition. Is it reasonable to expect them to stand by while the nation is again disarmed?

For the next thirty years the American Legion will have a very decided voice in the questions of foreign policies and the national defense. Who has a better right?

Admiral Vogelgesang and the Brazilian Navy

The following is an extract from a letter received from Captain Thomas A. Kearney, U. S. Navy:

"On February 16, which was the first anniversary of the death of Admiral Vogelgesang, Captain Fredrico Villar, the Brazilian Naval Attaché, with the approval and collaboration of our Navy Department, and in the presence of a group of ranking American naval officers, an Army guard of honor, representatives of the Vogelgesang family and former members of the United States Naval Mission to Brazil, spread the Brazilian national ensign over the grave of Admiral Vogelgesang, and after an appropriate address placed the floral wreath which he had provided on behalf of the Brazilian Navy, the Commander-in-Chief of the Brazilian Fleet, and the President of the Brazilian Naval Club. Upon the completion of Villar's remarks, Rear Admiral Schofield, U. S. Navy, speaking in behalf of the U. S. Navy Department, made an appreciative reply of acceptance."

It will be remembered that Admiral Vogelgesang was for two years chief of the United States Naval Mission to Brazil.

The Enlisted Man of Today

In this issue of the PROCEEDINGS will be found a discussion of "The Destroyer Leader," written by John Dahlgren Wilson, signalman, first class, U. S. Navy. Wilson enlisted in the Navy in 1920 with the intention of taking the entrance examination to the Naval Academy during the following year. He did take these examinations and passed but was rejected for being underweight. Upon the completion of his first cruise he re-enlisted and was assigned duty on board the U.S.S. *Noa* on the Asiatic station. Those who read Lieutenant Com-

mander R. C. Smith's article "Nanking, March 24, 1927," which appeared in the January PROCEEDINGS, will remember the signalman who stood on the roof of the Socony House and relayed the "Commence Firing" message from the consul to the commanding officer of the *Noa.* Wilson was the senior signalman on the Hill and was awarded the Navy Cross for his gallantry on that day.

Our Photograph Collection

The photograph library is still increasing and now has reached respectable dimensions. It is our ambition to be able to turn to our card index system and bring forth appropriate photos at any time for any article. This is a large order but the beginning augurs well when we reflect that a year and a half ago we actually sent our manuscript to the printer without the lone photograph for the frontispiece for the main body of the magazine and the one for the Professional Notes Department. Upon these occasions we actually were unable to get a single photo until the *last minute* and then had to rush it. We were, so to speak, like the poor fellow who didn't know where he was going to sleep or where the next meal was coming from.

We are pleased to announce among recent additions that we have obtained the famous Roux collection of ship pictures, for which the Institute is duly appreciative to the Museum Committee of the Peabody Museum, Salem, Massachusetts.

We are likewise indebted to Mr. A. G. H. MacPherson, of London, for the privilege of publishing illustrations from his famous collection, of which we now have many excellent copies.

Our Library also contains a number of beautiful etchings of Annapolis by Metour.

From Peking, China

My predecessor was delighted to receive a letter some time ago from Commander I. V. Gillis, now retired and living in Peking. Commander Gillis wrote:

Our engineering friends (and others) flood their papers with "organization charts," as if no one ever heard of such a thing before, and they seem to take all the credit for having evolved the thing.

Why not call attention in the PROCEEDINGS to our good old-fashioned "Station Bill" of the sailing ship days? Certainly, it was (as are the bills of today) a model of organization, and it dates way back, too. It might be of interest to the younger generation if you published in the PROCEEDINGS a small part of the "Station Bill" of one of our old ships—say the *Vincennes,* for example. Go to it.

We have never seen that of the *Vincennes,* but the one now in the Naval Academy Museum of a ship commanded by Matthew C. Perry would certainly prove of interest. Maybe the Secretary will be able to publish it some day.

Trafalgar vs. Jutland

We have received from the Naval Historical Foundation a photographic copy of a letter written by Lord Nelson to a British officer regarding gun sights. It presents a certain tactical attitude on the part of Nelson which he carried out successfully in battle.

Downs, August 21st, 1801.

Dear Sir

I have seen your friend's machine for keeping a gun at one continued elevation although you cannot see the object. On shore in batteries at night it must be very useful but on board ship where our positions vary every moment I am rather of opinion it will not be brought into use. The best and only mode I have found of hitting the enemy afloat is to get so close that whether the gun is pointed

upward or downwards, forward or aft, that it must strike its opponent. I merely send this as an answer to the letter directed for you which Lady Hamilton sent me and without venturing to give a decisive opinion how far it may be useful on board ship. I am Dear Sir

Your very Obedient Servant

Nelson & Bronte

Nelson was an exponent of "in fighting"!

A Case of Grand Strategy—1812

The 448th capture of the War of 1812 is recorded thus by Thomas Clark. "No. 448.—Sloop *Eagle,* a tender to the *Poictiers* off New York, captured by a fishing smack fitted for the purpose."

The manner in which this fishing smack, the *Yankee,* was fitted out and the grand strategy used by her skipper to effect the capture of the *Eagle* was found recently by Rear Admiral Elliot Snow, (CC) U. S. Navy. The "find" is in the form of a newspaper clipping, yellowed with age, without any identification marks as to date or source, which circumstance prevents the customary acknowledgement of prior publication except in this general way. It appeared however about a third of a century ago in the New York *Sun* from which the clipping here quoted was reprinted.

"It has been seriously charged, and with some grain of truth, that during the War of 1812, British naval officers on blockading vessels stationed off the coast of the United States kept as sharp a look-out for small trading craft, laden with poultry, sheep and other good things with which to stock their scant larders, as they did for enemy cruisers. The Americans were not long in discovering this weak point in their enemy and on more than one occasion this cost England more than she bargained for. On July 4, 1813, a party of Connecticut fishermen planned to capture the British sloop-of war *Eagle* which was cruising in Long Island Sound.

"The 'grand strategy of war' on this occasion was based on the well known fondness of British naval officers for mutton. The fishing smack *Yankee* was fitted out in New York harbor early on the morning of July 4, having forty well-armed and resolute men concealed in her hold; while three innocent-looking fishermen together with a calf, a sheep and a goose were purposely left on deck in plain sight.

"Working her way through Hell Gate, the *Yankee* entered the sound to all appearances a harmless trading vessel. It was not long before the sharp-eyed look-out on H.M.S. *Eagle* espied the calf; although her commander claimed he was the first to see the sheep, and others to hear the honk of the goose. However this may be, away the *Eagle* went in full chase after her prey, as it were. The innocent looking fishermen affected to make great efforts to escape, but promptly heaved to when the order was given within range of gun shot.

"The *Eagle* gallantly ran alongside, the eyes of her crew sparkling and their mouths watering at the sight of the calf, the sheep and the goose. Rome was saved once by the cackling of geese—but just at this moment the watchword 'Lawrence' was passed and in an instant forty determined Americans arose on deck, as if by magic, firing instantly and killing and wounding a number of the English crew and driving the rest below. The Americans boarded the *Eagle* and hoisted the Stars and Stripes over the British colors and carried the sloop safely into New York. There the crew of the fishing smack was greeted with enthusiasm by the people who at the Battery were celebrating the 'Glorious Fourth.'"

PICTURES. For prices on colored frontispieces, framed and unframed, see advertising page 5.